

**Marine Life Protection Act Initiative
Public Comments Submitted
through August 25, 2010**

From: Eric Nelson

Sent: Thursday, August 19, 2010 12:19 PM

To: MLPAComments

Subject: Proposed Special Closure around Castle Rock NWR & SMRMA in SoHum Bay

All,

Hopefully, this is going to the right folks. If not, if someone could forward to appropriate folks, that would be great.

(See attached file: MLPA10_18_10.doc)

Eric T. Nelson
Refuge Manager
Humboldt Bay National Wildlife Refuge Complex



United States Department of the Interior

FISH AND WILDLIFE SERVICE

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19 August 2010

Blue Ribbon Task Force
Marine Life Protection Act Initiative
c/o 1416 Ninth St.
Sacramento, CA 95814

RE: Marine Protected Areas on California's north coast

Dear Members of the Blue Ribbon Task Force, Special Closures Group and Regional Stakeholders Group:

First, I'd like to sincerely thank you all for serving through such a challenging and time consuming process. Hopefully the end result will be of great benefit to the coastal resources. That said, I'd like to provide the Service's professional perspective on the closure distances being considered for Castle Rock NWR and proposals discussed for South Humboldt Bay.

As you all know, Castle Rock NWR is a relatively small island, but it has inordinate importance within the California Current System. Depending on the year, it hosts either the largest or second largest common murre breeding colony in the system. As murres are colonial and surface nesting, they are one of the most susceptible species of seabirds to disturbance. This colony also has a relatively long-term data set associated with it (>20 years for murres), has active and ongoing research, and is a site specified in the California Current System Seabird Monitoring Manual for long term studies and research. Castle Rock NWR is also home to 12 other species of seabirds, is a key nighttime roost site for 25-35K Aleutian cackling geese from February to April each year, and has in the past been a breeding location for peregrine falcons. In addition to avian species, it is a primary haulout for at least 4 species of marine mammals, including Stellar Sea Lions.

For all these reasons, I would encourage you to provide this island with the largest protective buffer from boating disturbance that you can all come to consensus on. I believe you are all aware of the study that was done @ Three Arch Rocks NWR on the Oregon Coast which recommends a minimum of 500', as well as some studies on the central California coast that recommends much greater distances to buffer seabirds from disturbance. Looking at the distances recommended or put in place for central coast islands and headlands, they vary from 300' to 1000', and in some cases such as Devil's Slide and the Farallon's the distances vary with location. This seems like a good approach for Castle Rock NWR also, as the west side of the rock is a very steep cliff and would be well buffered by 300', whereas the east side, where birds and marine mammals are more exposed to potential disturbance would be better served by a 500' or 1000' buffer. Given what was observed at central California sites and because of its importance as a research site, the Service would recommend a 1000' buffer on the east (mainland) side of the rock.

As the number of recreational boaters and boat types that use the nearshore coastal waters continues to increase, and shows no sign of slowing; coupled with the significant impacts just one ill-advised disturbance event can cause, it seems the larger buffer is readily justified.

The use of a special closure around Castle Rock NWR would be completely consistent with the goals of Fish and Wildlife Service and the refuge. This refuge is already closed to the public because of the sensitive nature of the resources there and a special closure would provide those resources substantially greater protection.

Turning to the proposed State Marine Recreation Management Area (SMRMA) on South Humboldt Bay, I have some concerns. First, I feel that South Humboldt Bay and the resources therein are already generally well managed and regulated, and that restrictions associated with SMRMA's would not address disturbance issues which may be currently impacting (or could in the future impact) avian populations using South Humboldt Bay.

I have discussed this issue with many folks with strong interests around the bay. My understanding is that the current proposal focuses on a large "block" in the southwest corner of South Bay. While I can not see much benefit to bay resources from the current proposal, the refuge would not oppose it. This area includes the Table Bluff Unit of the refuge, which is a combination of mudflat and salt marsh transitioning to dune uplands. There was formerly a larger amount of salt marsh in the portion of this area adjacent to Table Bluff but it was diked and converted to pasture. Some years after the refuge purchased it the dikes were breached and that area reverted primarily to mudflat.

However, if the proposed area were to be expanded to include the area in the southeast portion of South Bay, including Hookton Slough, Teal "Island", and other refuge areas, I would be against that. My opposition would be based on the aforementioned lack of clear benefits and on regulatory uncertainty that could restrict or constrain potential restoration activities such as placement of large wood for habitat cover and complexity in Hookton Slough; or placement of "clean fill" or clean dredge spoil in former salt marsh areas to gain needed elevation to regain salt marsh lost to previous activities or future changes tied to sea level rise. Both of these project types were suggested in the refuge's recently approved Comprehensive Conservation Planning document.

Again, your efforts on behalf of the coastal resources are greatly appreciated. If you have any questions or desire clarification or further explanation/discussion, please contact me at (707) 733-5406 or via email at Eric_T_Nelson@fws.gov.

Sincerely,

Eric T. Nelson
Refuge Manager



From: stephen@wiyot.us
Sent: Monday, August 23, 2010 8:28 AM
To: Adam Wagschal; 'MLPA North Coast Regional Stakeholder Group'
Cc: 'Abi Queen'; thpo@bearrivertribe.com; 'Mike Wilson'; 'Patrick Higgins'; 'Ronnie Pellegrini'
Subject: Re: New Emerald Array

Greetings everyone,

Please be aware that the Wiyot Tribe remains strongly opposed to any MPA in South Humboldt Bay, neighboring Table Bluff Reservation, especially while the issue of traditional Tribal gathering rights remains unresolved.

regards,

Stephen

Stephen Kullmann
Environmental Director
Wiyot Tribe
Loleta, CA 95551
<http://wiyot.us/environmental>

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From: [Adam Wagschal](#)
Sent: Friday, August 13, 2010 5:10 PM
To: ['MLPA North Coast Regional Stakeholder Group'](#)
Cc: ['Abi Queen'](#) ; stephen@wiyot.us ; thpo@bearrivertribe.com ; ['Mike Wilson'](#) ; ['Patrick Higgins'](#) ; ['Ronnie Pellegrini'](#)
Subject: New Emerald Array

Greetings!

We want to make you aware of a revised Emerald MPA Array we posted on MarineMap. You will find it under Adam Wagschal titled "Emerald – August 11 2010 - Draft". This array is the result of numerous community and Regional Stakeholder Group meetings. We recognize this as a strong cross-interest MPA array which represents a MPA network that meets the goals of the MLPA while minimizing social and economic impacts. We acknowledge that it does not fully conform to the guidelines established by the MLPA Science Advisory Team (SAT), but believe that adding more area to the network in order to meet the SAT guidelines would not be justified under existing socioeconomic and regulatory conditions.

We expect some modifications to the array will occur in order to address DFG Feasibility guidelines and to better allow for traditional ceremonial and subsistence

uses by California Tribes and Tribal Communities. We look forward to working with you on these items.

Best regards, Pete Nichols and Adam Wagschal

Pete Nichols

Executive Director, Humboldt Baykeeper

Pacific Regional Representative, Waterkeeper Alliance

www.humboldtbaykeeper.org

www.waterkeeper.org

From: Adam Wagschal
Sent: Tuesday, August 24, 2010 4:30 PM
To: MLPACComments
Cc: Melissa Miller-Henson; 'Kelly Sayce'
Subject: FW: Report and Summary

Please forward to the Blue Ribbon Task Force and Science Advisory Team, let me know if I can / should provide hard copies.

Thank you, Adam

NORTH COAST PRE-MLPA COMMUNITY-BASED SOCIOECONOMIC CHARACTERIZATION AND RISK ASSESSMENT

- Second Interim Report -

Characterization of the MPA-Affected North Coast Human Environment



Prepared for

The County of Humboldt Headwaters Fund

by

IMPACT ASSESSMENT, INC.

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August 2010

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Ms. Dawn Elsbree, Coordinator
Humboldt County Headwaters Fund
520 E Street
Eureka, California 95501

August 24, 2010

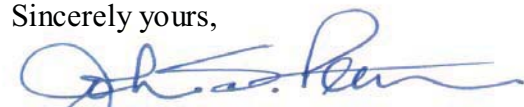
Dear Ms. Elsbree:

We are pleased to submit the Second Interim Technical Report for the *North Coast Pre-MLPA Community-Based Socioeconomic Characterization and Risk Assessment*. The attached report, titled "Characterization of the MPA-Affected North Coast Human Environment" significantly expands our efforts to accurately document the socioeconomic and demographic context within which the Marine Life Protection Act (MLPA) is being implemented along the North Coast. As such, the current report sets the stage for systematic socioeconomic assessment of the risks and benefits of various MPA array scenarios.

Coupled with additional archival data and data from extensive in-depth interview and user group mapping work undertaken by our firm in the study region during recent months, this report and the analysis provided in the forthcoming risk assessment will enable well-informed deliberation regarding any new marine reserves to be established along the North Coast under stipulations in the MLPA. Please note that we have applied extra time and energy to make the attached materials as useful as possible for planners and other decision-makers who seek to maximize the social and economic benefits of the MLPA process across the North Coast region.

Please feel free to contact us should you have any questions about the attached report, or regarding the current status of the research and analytical components of this important project.

Sincerely yours,



John S. Petterson, Ph.D.
Principal Investigator



Edward W. Glazier, Ph.D.
Project Manager

NORTH COAST PRE-MLPA COMMUNITY-BASED SOCIOECONOMIC CHARACTERIZATION AND RISK ASSESSMENT

- Second Interim Report -

Characterization of the MPA-Affected North Coast Human Environment

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NORTH COAST PRE-MLPA COMMUNITY-BASED SOCIOECONOMIC CHARACTERIZATION AND RISK ASSESSMENT

- Second Interim Report -

Characterization of the MPA-Affected North Coast Human Environment

1.0 Introduction

This is the second in a series of technical reports being submitted to the County of Humboldt Headwaters Fund under the study titled *North Coast Pre-MLPA Community-Based Socioeconomic Characterization and Risk Assessment*. The study is being conducted to provide agencies and stakeholder groups in Humboldt, Del Norte, and Mendocino Counties with information needed to understand and address the potential socioeconomic effects of establishing a new network of marine protected areas (MPAs) along the North Coast region of California,¹ as required by the California Marine Life Protection Act (MLPA) of 1999.

The first interim report used archival and interview data to describe basic sociodemographic, economic, and fisheries-specific aspects of the North Coast study area. This report more thoroughly documents the human context within which the MLPA is being administered along the North Coast. The present work is focused especially in documenting important social, economic, and spatial relationships between: (1) commercial and recreational fishing fleets and the nearshore marine environment of the North Coast, (2) commercial and recreational fishing fleets and the businesses and industries that support the fleets, and (3) the commercial and recreational fishing industries and the shoreside communities in which they are situated. As such, this report documents the component parts and linkages that comprise the marine fisheries systems of the North Coast, and thus the human environment that is subject to the effects of area-based fishery closures. The report is intended to inform decisions that would minimize the socioeconomic costs and maximize the biophysical and human benefits of the new network of marine reserves.

Background. As required by the MLPA, a new network of MPAs is currently being designed and will soon be implemented along the coastlines of Humboldt, Del Norte, and Mendocino Counties. Because the North Coast fishing industry is already constrained by an assortment of economic, regulatory, and environmental challenges, and because some operators and business owners in the fisheries and distribution support sectors are struggling to remain in the industry, closure of certain fishing grounds has the potential to reduce involvement in commercial and

¹ As defined in relation to the MLPA process, the “North Coast” of California includes Humboldt and Del Norte Counties, and the northern part of Mendocino County. Because MPAs have already been designated in southern Mendocino County, the current analysis does not address that portion of the county in the same manner as the remainder of the North Coast, where MPA array options are still being developed.

recreational activities that have been central to the North Coast economy for many decades. Given a lack of viable employment alternatives, it is likely that the new network of MPAs will generate some detrimental social and economic effects to the region's commercial, charter, and recreational fishing fleets and to the ports, harbors, businesses, and communities that support them.

The situation is complicated by a relative lack of local and regional economic alternatives. The Northern California timber industry has been in decline for decades, the current recession is constraining tourism activity, and the region is not physically well-connected to significant population centers and the economic opportunities available in such areas. Moreover, while the new MPAs may eventually generate environmental benefits along the North Coast, it is as yet uncertain whether closed fishing grounds will one day be reopened. In any event, living marine resources will not immediately flourish within the MPAs or in areas adjacent to the new reserves. Thus, any socioeconomic benefits potentially resulting from MPA-induced improvements to the status of the region's fish, crab, and shellfish populations can occur only over the long-term. Given the uncertainty of long-term MPA benefits and the likelihood that area closures will constrain an already challenged fishing industry in the near-term, especially under certain MPA array scenarios, work is needed to develop a clear understanding of fleets and communities that are particularly vulnerable to MPA-related changes.

Impact Assessment and the Headwaters Fund. This study is being conducted for the Humboldt County Headwaters Fund by Impact Assessment, Inc. (IAI), a California-based research firm that has specialized in objective assessment of socioeconomic dimensions of marine fisheries and related coastal zone management issues since 1980. The firm and its principals are highly experienced in the objective assessment and monitoring of social and economic changes potentially or actually following from regulatory measures intended to improve management of public trust natural resources around the coastal zone of the United States.

The Headwaters Fund was established in 2003 as a public sector resource for advancing the economic well-being of communities in Humboldt County. Entities and agencies that channel the fund- such as various County of Humboldt agencies, the City of Eureka, and the Humboldt Bay Harbor, Recreation and Conservation District- are likely to benefit from the data and analytical products resulting from this project, both in a general sense under the County's Comprehensive Economic Development Strategy, and with direct regard to information needed to effectively anticipate and plan for implementation of the MLPA in Humboldt County. Such products will be of value for the same reasons to planners and other officials in neighboring Mendocino County and Del Norte County.

1.1 Overarching Goal and Underlying Rationale

The *North Coast Pre-MLPA Community-Based Socioeconomic Characterization and Risk Assessment* was developed to provide public officials with scientific information needed to assess and adjust for any potential MPA-related effects that are likely to be detrimental to fishermen and other residents of coastal communities across Humboldt County and adjacent counties, and to maximize any potentially beneficial outcomes of the MLPA process in the

region. The project is specifically designed to improve the quality and quantity of social and economic information that is available to inform decisions regarding the selection of MPA arrays for implementation along the North Coast. The basic rationale underlying the study is that the potential human benefits and liabilities resulting from establishing any new network of MPAs along the North Coast have not been sufficiently assessed and that such assessment must occur before decision-makers make any final determinations regarding the number, size, and placement of the new reserves.

Documenting the nature of the potentially affected human environment and assessing potential risks and benefits of MPA arrays *in advance* of the regulatory action is directly analogous to the sequence used by federal agencies under stipulations in the National Environmental Policy Act of 1969 and other federal policies that call for early determination and equitable distribution of benefits and liabilities associated with regulated use or development of public trust resources. In this sense, the *North Coast Pre-MLPA Community-Based Socioeconomic Characterization and Risk Assessment* is, in the context of the MLPA Initiative, a novel and proactive commitment to a well-tested evaluative sequence that will maximize the quantity and quality of social science information available for decision-making purposes *prior to* implementation of the action in question - in this case, establishment of new marine reserves and associated restriction and/or displacement of economically viable commercial and recreational fishing activities and other uses of the marine environment.

The project is also intended to improve understanding of the biophysical consequences of the new MPAs - as indicated by the reaction of fishermen to MPA-induced closures of commercial and recreational fishing grounds. Prior research in the Central California region clearly indicates the tendency of commercial and recreational fishermen to adapt to closure of historic grounds by fishing in close proximity to the margins of the new reserves and/or in other suitable ocean areas within a reasonable distance from port. This has led to highly concentrated fishing activity in certain areas and, in some cases, crowding and conflict (Impact Assessment 2010). Although the biological effects of MPA-induced displacement and re-concentration of fishing effort are generally not well understood or well-communicated in the MPA literature, it is obvious that displaced and re-concentrated fishing effort bear implications for the status of the marine ecosystems of which the reserves and adjacent ocean areas are component parts. In actuality, assessment of the interface between physical and human effects of a government action such as those occurring via the MLPA process is an important element of a sufficient environmental review process. This is elucidated in the 2009 Amendments to the California Environmental Quality Act (CEQA) Guidelines,² which state that:

Where a physical change [in this case, a putative shift in fishing pressure on marine ecosystems along the North Coast] is caused by economic or social effects of a project [in this case, the project is establishment of new reserves under the MLPA and the social effects involve forced displacement of fishing activity], the physical change may be regarded as a significant effect in the same manner as any other physical change resulting from the project. Alternatively, economic and social effects of a physical change may be

² As directed by SB97, the California Natural Resources Agency adopted Amendments to CEQA Guidelines on December 30, 2009. On February 16, 2010, the Amendments were approved by the Office of Administrative Law and filed with the Secretary of State to be included in the California Code of Regulations. The Amendments became effective on March 18, 2010.

used to determine that the physical change is a significant effect on the environment. If the physical change causes adverse economic or social effects on people, those adverse effects may be used as a factor in determining whether the physical change is significant. For example, if a project would cause overcrowding of a public facility and the overcrowding causes an adverse effect on people, the overcrowding would be regarded as a significant effect [a reasonable analogy being MPA-induced displacement of fishing effort and resultant crowding along the margins of a reserve or in adjacent areas with favorable habitat].

However, it must be noted that the CEQA- related Environmental Impact Review (EIR) process undertaken in association with the MLPA Initiative has thus far incorporated only very limited social or economic assessment of the new MPAs *prior to* their designation and implementation. Such assessment has been limited to modeled ex-vessel value losses potentially resulting from closed fishing grounds. It is significant in the context of CEQA and in the lives of the region's fishery participants that such models *have not* sufficiently addressed:

- (a) the economic costs or environmental implications of displacement to adjacent or other unregulated areas within the region's larger marine ecosystems;
- (b) the social or economic challenges or environmental implications of increased crowding, competition, or conflict resulting from MPA-induced re-concentration of fishing effort; or
- (c) the economic or social costs of lost or displaced fishing opportunities as these may affect fishery support sectors and coastal communities, particularly in the context of ongoing environmental, regulatory, and other challenges in the region's marine fisheries, including the current regional and national economic recession.

Given the lack of empirical data on these critically important issues, certain findings in the State's EIR documents for the North Central MLPA process are necessarily speculative in nature. The *North Coast Pre-MLPA Community-Based Socioeconomic Characterization and Risk Assessment* will serve to reduce such speculation for the North Coast MLPA process by providing empirically based description and analysis of the potentially impacted human and physical environments, the likely nature of interactions between fishing fleets and the marine environment under various MPA array scenarios, and the broader socioeconomic implications of implementing area closures given existing fisheries-specific and other social and economic challenges along the North Coast.

1.2 Geographic Scope of the Project

This study is focused on description and assessment of marine fisheries and related conditions and factors in Humboldt County, northern Mendocino County, and Del Norte County. Compilation and analysis of existing archival data and new primary source information are being directed to facilitate a clear understanding of the potential human implications of the MLPA process for commercial and recreational fishing fleets, harbors, and coastal communities across the region. Particularly intensive primary source research is being conducted in Crescent City, Trinidad, Eureka, King Salmon, Shelter Cove, Fort Bragg, and Albion.

The study involves analysis of data regarding relevant conditions and factors across those areas of the North Coast where new MPAs have not yet been implemented under the MLPA. Region-wide coverage is a logical strategy since: (a) comparative analysis is likely to underscore any unique economic or social attributes or vulnerabilities in each study county and/or its respective communities; (b) documentation of social and economic connections between the region's commercial and recreational fishing fleets, communities, and affected counties will enhance planning for and management of potential MLPA-related risks and benefits both within and across each of the three counties in this distinctive geographic region of California, and (c) the strategy will accommodate the dynamic realities of marine fisheries, which very often involve operational and economic transactions across jurisdictional boundaries.

1.3 Project Objectives, Associated Research Methods, and Pertinent Research Questions

The *North Coast Pre-MLPA Community-Based Socioeconomic Characterization and Risk Assessment* is using a systematic approach to satisfy the central objectives of the project, which involve empirically based identification, documentation, and analysis of the component parts and linkages that comprise the marine fisheries "systems" of the North Coast; and assessment of how the candidate MPA array alternatives could affect such systems and thereby present the possibility of risks or benefits to fishery participants and other residents in the adjacent communities. That is, the project is generating a valid and thorough understanding of: (1) historic and contemporary patterns of use of the ocean environment by the various North Coast commercial and recreational fishing fleets and other ocean user groups in the region; (2) the social and economic relationships of those fleets and user groups to the shoreside industries and communities that support them; and (3) the potential for the MPA arrays to negatively affect or benefit such use patterns and social and economic linkages over the near- and long-term.

Rather than using limited data of uncertain validity to estimate the economic effects of the new MPAs, the strategy employed in the current study emphasizes the need for a wide range of empirically grounded and cross-validated social and economic data, and quantitative and qualitative analysis deriving from sustained work in the study communities. To date, estimates of the economic costs of establishing prospective MPAs along the California Coast under the MLPA have merely been modeled, and for the harvest sector only. Moreover, the modeled estimates have been based largely on a single variable (hypothetical removal of ex-vessel value associated with recently reported landings from areas identified as important by fishermen), and the data upon which the models have been constructed have been compiled from short-term interaction with available respondents and existing databases. It must be noted that the models have not clearly or consistently accounted for potentially highly significant MPA-induced changes in the spatial distribution and/or manner and extent of fishing effort, nor has there been adequate accounting of the shoreside effects of any new MPAs, or analytical controls for or assessment of the historic or contemporary social, economic, or regulatory context within which the region's fisheries have been and are being conducted.³

³ While these critical elements of holistic analysis were pivotal in IAI's MLPA-related work along the Central Coast, again, the study was not funded until after the MPAs had already been implemented.

Project Objectives and Research Methods. The current project is the first to address the significant limitations described above in advance of the MLPA MPA array selection process. Doing so has required the satisfaction of ten basic project objectives and use of well-tested social science research methods involving: compilation, review, and analysis of relevant and valid secondary source data; use of a systematic social network sampling process; extensive in-depth interviewing and other ethnographic work with key persons active in the public sector and in the commercial and recreational fishing industries and related support businesses across the study region; and sustained presence and ethnographic observation in the study communities.

Each of the research methods used during the course of this project is well-tested and thoroughly described in the social science research literature,⁴ and each has been successfully used by IAI over the past 30 years. The project has also involved the review and appropriate use of data and findings from other fisheries social science studies conducted in the study area between 2005 and the present.⁵ The project objectives, now largely satisfied, are as follow:

- (1) Conduct preliminary, reconnaissance-type fieldwork in North Coast communities, serving to initiate working relationships between IAI and public officials, industry leaders, and other key persons in the study communities and county; and to initiate development of valid research protocols for use during subsequent in-depth research in the region;
- (2) Compile and conduct extensive review and analysis of existing databases⁶ of relevance for characterizing social, economic, demographic, and cultural aspects of life in the study region, with particular emphasis on data regarding socioeconomic and demographic conditions among the fleets, ports, and communities that are most likely to be affected by the new MPAs in the North Coast study region;
- (3) Employ a rigorous social network sampling process to identify key persons in the harvest, distribution, and support sectors of the region's commercial and recreational marine fisheries, and to identify particularly knowledgeable persons in those sectors;⁷
- (4) Build and sustain lasting working relationships and trusted confidence with resource user group representatives, fishery participants, and others with a stake in the process and

⁴ Readers are referred especially to *Research Methods in Cultural Anthropology – Qualitative and Quantitative Methods*. 1995. H. Russell Bernard. Second edition. Walnut Creek: Altamira Press.

⁵ Members of the current research team formerly led or participated extensively in fisheries-specific community studies in the North Coast study region (see Pomeroy, Thomson, and Stevens 2009a, 2009b, 2010a, and 2010b).

⁶ This would ideally include review and potential use of the socioeconomic database developed by Ecotrust during its work with fishermen along the North Coast as part of the MLPA Initiative.

⁷ For detailed discussion of this methodology and its potential for enhancing MPA-related socioeconomic analysis along the Coast of California, readers are referred to Petterson and Glazier. 2008. Fishery Management, Monitoring Systems, and Data layering in Data-Poor Environments. Proceedings from the *Managing Data Poor Fisheries Workshop* sponsored by California Sea Grant Extension Program and California Department of Fish and Game. In press.

outcome of the MLPA in the region; such relationships are critically important for ensuring the validity of interview data and can be developed only through sustained presence in the study communities;

- (5) Conduct a series of increasingly exacting in-depth interviews and mapping work with highly knowledgeable persons in each of the affected commercial and recreational fisheries and other ocean use groups, and cross-validate the results with archival data and data of observation in order to develop a thorough and valid understanding of: (a) historic and contemporary resource use patterns and the various opportunities and constraints that have affected those use patterns over time, (b) social and economic linkages between specific ocean user groups and shoreside support businesses/industries across the study communities and counties; and (c) the potential social and economic risks and benefits of establishing new marine reserves in the North Coast region as these may affect ocean user groups, support sector industries, and adjacent communities;
- (6) Develop a formalized descriptive and analytical socioeconomic characterization of the study communities and counties based on synthesis of valid spatial, archival, and primary source ethnographic data to document, describe, validate, and explain: (a) trends and spatial variability in use of the marine environment by commercial and recreational fishing fleets and other groups; (b) linkages between those uses/groups and shoreside support businesses and industries; and socioeconomic and demographic trends and conditions in the ocean industries and communities prior to establishment of any new MPAs;
- (7) Use the above socioeconomic characterization as the basis for formally assessing the potential economic and social risks and benefits of establishing arrays of new marine reserves along the North Coast; use analyses that will enable analytical parsing of potential MPA effects from other sources of change and preliminary identification of social and economic variables that may serve as valid indicators of long-term MPA-related socioeconomic, social-behavioral, and biophysical change; utilize both qualitative and quantitative data and analysis to compare the socioeconomic risks of the most viable (potentially implemented) array alternatives, as these may affect commercial and recreational fishing and related support sectors and communities across the study region;
- (8) Report all descriptive and analytical findings in full and summary terms to the Headwaters Fund and to resource managers and other public officials who will be involved in the MLPA process in Northern California; provide interim reports in timing with the needs of public officials and other stakeholders involved in the assessment of MPA array alternatives during the late summer and fall months of 2010;
- (9) Generate recommendations for systematic monitoring and assessment of the human effects of the new North Coast MPAs over the long-term; and
- (10) Present project findings in a final meeting with Headwaters Fund and other public sector entities in the North Coast region.

Pertinent Research Topics and Questions. This study examines the historic and contemporary status of the principal fisheries that have been and are being conducted from the study communities, and the full and intricate manner in which commercial and recreational fishing is linked to the study communities and region as a whole. Valid documentation of social and economic linkages is critically important, since the region's principal fisheries generate opportunities and revenue for the communities and counties of the North Coast via relationships and transactions between the fishermen/anglers and the seafood distribution sectors, support businesses, harbors, and communities that sustain and are sustained by the commercial and recreational fishing activity. Valid and/or accurate estimation of the economic effects of any new MPAs is impossible in the absence of such documentation.

Thus, an important objective of this study is to adequately describe the nature of social and economic linkages between the fisheries sectors, and by extension, between the fisheries sectors and the larger economies of the communities and county. This leads to a series of questions regarding the capacity of participants in the harvest and associated support sectors to persist in the industry in the face of any future source of change (including MLPA-mandated area closures) and/or to adapt by finding viable economic alternatives. Similarly, uncertainties arise in conjunction with potential constraints on and the secondary effects of any new space-use restriction on recreational fishing. Questions that would help explore these eventualities and provide data for analytical control of intervening variables have therefore included, but have not been limited to, the following:

- What principal physical environmental, economic, and social factors have conditioned participation and production in the region's commercial and recreational fishing industries and to what extent over the course of time, and how do these conditioning factors vary in nature and effect for specific fisheries and communities?
- What is the nature of social and economic linkages between each sector of the region's principal fisheries and between each sub-region in the study area?
- How have fishery participants in all sectors and sub-regions adapted to changes in the marine environment, the seafood market, and the regulatory environment over time?
- How have such adaptive strategies varied by fishery and by community; and why have some participants exited from fishing-related sectors of the region's economy?
- How does participation in the region's principal fisheries vary in terms of time, effort, and level of success; that is, for instance, what percentage of participants in the commercial harvest sector can be considered high-liners, full-timers, or part-timers, and are there natural breaks that would indicate a useful typology of participation and production?
- For those who do not fish on a full-time or avid commercial basis, typically what alternative forms of employment or income are used to supplement the household income; do such activities include work as fishing guides or charter operators and what is the nature and extent of opportunity in the recreation-oriented fishing sector?

- For those who do fish on a full-time or avid basis, have alternative forms of employment or income been undertaken to maintain the fishing operation or household budget, and if so, what is the nature of these alternatives; to what extent and how often are they undertaken; and do they include work as fishing guides, as charter operators, or in some tourism-related capacity?
- To what extent do persons in the harvest sector participate in multiple fisheries over the course of a given year; what are the typical configurations in this regard; and why, how, when, and where are such strategies typically employed?
- What ocean areas are most important to participants in each of the principal fisheries, and what general economic effects can be anticipated for all sectors under scenarios in which certain productive or relatively non-productive areas are closed to commercial or recreational fishing activity?
- To which areas will commercial or recreational operators likely redirect their efforts should certain fishing grounds be declared off-limits to fishing, and what are the likely costs associated with such regulation for participants in each sector of the region's principal fisheries?
- Will area closures contribute to ongoing operational challenges in a cumulative or confounding manner, and if so, how, and what are the implications of such changes; might certain operators no longer be able to persist in a given fishery?
- What is the likelihood that social conflicts or gear interactions will occur as a result of MPA-induced re-concentration of fishing effort and how might these be prevented or mitigated?
- What is the status of other industries of the region (such as the timber, agricultural, and tourism industries), and what is the likelihood that these could provide sources of employment for persons displaced from the region's marine fisheries as a result of the establishment of new marine reserves or other constraining factors and events?
- Given: documented trends and the current status of the region's marine fisheries; known use areas and patterns of use of the marine environment; demonstrable relationships between the fleets, shoreside support businesses, and host communities; and background socioeconomic conditions in those communities, how will regulatory removal of specific fishing grounds re-order the fisheries systems of the North Coast?

1.4 Research Products and Deliverables

This project is generating descriptive and analytical information to the sponsor as needed for decision-making purposes. This second interim report provides public officials and stakeholders with descriptive information and preliminary analysis needed to better conceptualize the potentially affected human environment and the general nature of potential MPA effects on that

environment. The report empirically identifies, defines, and analyzes the component parts and linkages that comprise marine fisheries “systems” of the North Coast. The report thereby documents historic and contemporary patterns of commercial and recreational use of the North Coast ocean environment, and the social and economic relationships between the fishing fleets and other user groups to the shoreside industries and communities that support them. This will form the basis for developing a valid and empirically based assessment of the potential risks and benefits of specific MPA array alternatives in the initial project report.

The Initial Project Report will be titled *Socioeconomic Characterization of the Affected Human Environment and Analysis of North Coast MPA Array Scenarios*. This report will provide initial socioeconomic assessment of select MPA array scenarios to public officials and stakeholders in Humboldt, Del Norte, and Mendocino Counties. The document will include: (1) a prefatory section summarizing the goals and objectives of the project, research methods used, challenges encountered during the study, and solutions used to meet those challenges; (2) project findings, including full description of the affected human environment and analysis of the human environmental risks and benefits potentially arising from those MPA array alternatives that are most likely to be considered for implementation; and (3) recommendations for developing a monitoring framework with which to assess human dimensions of the new MPAs over the long-term. The document will include cited references and an annotated bibliography.

The Final Project Report will be titled *Socioeconomic Characterization of the Affected Human Environment and Final Analysis of North Coast MPA Array Scenarios*. This document will incorporate recommended revisions to the initial project report and an Executive Summary describing the basic nature of the project, select elements of the affected human environment, key results of the risk assessment, and summary recommendations for a long-term human dimensions monitoring framework.

1.5 Organization of this Document

Following this introductory chapter, Chapter Two describes select socioeconomic and demographic trends and current conditions in Humboldt, Del Norte, and Mendocino Counties. The chapter is based largely on archival sources such as the U.S. Census and the Bureau of Economic Affairs (BEA). Information regarding state and national trends is provided for sake of comparison. Of particular note in the chapter are indications of long-term economic challenges across the region, recently compounded by the national recession. Chapter Three describes trends and conditions in the commercial and recreational fisheries of the North Coast. The discussion is organized by county, and within each county, by port. This chapter expands previous description of the region’s commercial fisheries and includes new material describing the recreational fisheries of the North Coast. Chapter Four provides additional description of North Coast fisheries and communities, focusing especially on the nature of relationships between the North Coast fleets, the adjacent marine environment, the shoreside support sectors, and the host communities. This sets the stage for analysis of the potential socioeconomic risks and benefits of area-specific fishing closures associated with the new MPAs. References follow.

Map 1-1

Humboldt County and Adjacent Counties



2.0 Socioeconomic and Demographic Aspects of Humboldt and Adjacent Coastal Counties

Many residents of Humboldt, Del Norte, and Mendocino Counties have long had strong economic, social, and cultural ties to the region's marine resources. But of significance to the present study, the fishing and seafood processing sectors have generally declined over the past two decades (Kildow and Colgan 2005). Several factors have contributed to this decline, including: increasingly stringent fishing regulations; cycles of limited abundance of certain species; increased availability of farmed and imported salmon and other seafood products; declining market prices; rising overhead costs; and gradual loss of the critical mass of human and fiscal capital and physical infrastructure required to effect profitable commercial fisheries.

Constraints and challenges notwithstanding, many North Coast residents remain engaged in and/or dependent on some aspect of the region's fishing industry. This chapter provides context for understanding the macroeconomic and demographic context within which the industry and its participants are situated. It must be noted that much of the secondary data used in this report were compiled just prior to the national recession,⁸ and that trends of economic growth documented in many areas during the mid-2000s would soon be reversed, and significantly so.

Regional Demographic Overview. The North Coast is isolated by its rugged, mineral-rich mountain ranges and dense forests. The region has been occupied by Native Americans for millennia. Numerous tribes eventually established themselves in the region. The Tolowa, Yurok, Wiyot, Mattole, Sinkyone, Yuki, and Pomo each used ancestral lands along the coast. While the region was first explored by Europeans in the late eighteenth century, it was not settled until the mid-nineteenth century. Early homesteaders were attracted to the area's natural resources, including gold, timber, and fish.

The North Coast study region consists of Humboldt, Del Norte, and Mendocino Counties. Humboldt is the largest of the three North Coast counties in terms of total area and population (Table 2-1). Over 75 percent of all California redwood forests are located in the North Coast region, 40 percent of which are located in Humboldt County (Stewart 2007). The North Coast region is characteristically rural. A few small non-tribal communities were established along the coast during the mid-1800s to facilitate the gold mining, timber, and fishing industries. Today, the largest coastal population centers in this region are: McKinleyville, Arcata, Eureka, and Fortuna in Humboldt County; Crescent City in Del Norte County; and Fort Bragg in Mendocino County.

Table 2-1 Total Population and Square Miles of North Coast Counties

County	Total Population	Land Area (Sq. miles)	Water Area (Sq. miles)	Total Area
Humboldt	128,897	3,573	480	4,053
Del Norte	28,870	1,008	222	1,230
Mendocino	86,184	3,509	369	3,878
Total North Coast Region	243,951	8,090	1,071	9,161

Source: U.S. Census Bureau 2010

⁸ The U.S. Census Bureau provides county- and some city-level data through 2008, prior to the national recession. The Employment Development Department updates its labor force information on a monthly basis and therefore provides the most current employment data.

U.S. Census data indicate that the North Coast's population grew from 222,293 persons to 243,951 persons between 1990 and 2008, an increase of nearly 10 percent (U.S. Census Bureau 2009). Members of some 30 tribes used or currently use coastal and marine resources along the North Coast. Three tribes own land along the immediate coast: the Tolowa Tribe of the Smith River Rancheria, the Yurok Tribe, and the Cher-Ae Heights Indian Community of the Trinidad Rancheria. Native Americans comprise six percent of the persons living in the North Coast region. The following table presents figures for select demographic indicators for the three North Coast counties and region as a whole (Table 2-2). Data for California and the nation as a whole are included for comparison.

Table 2-2 Select Demographic Factors for the North Coast Region: 2006-2008

County	Total Population	Caucasian (%)	African American (%)	Native American (%)	Asian (%)	Hispanic*	Other (%)
Humboldt	128,897	82.3	1.0	5.5	2.1	8.2	9.1
Del Norte	28,870	73.8	3.3	7.8	3.0	16.0	12.1
Mendocino	86,184	86.8	1.0	4.7	1.5	20.1	6.0
North Coast	243,951	90.0	1.7	6.0	2.2	14.7	9.0
California	36,418,499	60.9	6.2	0.8	12.3	36.1	19.8
United States	301,237,703	74.3	12.3	0.8	4.4	15.1	8.2

* Persons of Hispanic origin may be of any race; therefore total population percentages exceed 100

Source: U.S. Census Bureau, 2006-2008 American Community Survey 2009

North Coast Regional Economic Overview. Historically, the North Coast regional economy has been based in natural resource extraction and exploitation. Today, economic and population growth in the North Coast region are challenged by a diminishing resource base, a rugged and geographically isolated landscape, extensive state and national park lands, limited inland truck and rail access, the national recession, and other regionally specific factors. Several select current economic characteristics of the North Coast region are depicted in Table 2-3.

Table 2-3 Select Economic Characteristics for the North Coast Region: 2006-2008

County	BA Degree or Higher (%)	Median Household Income (\$)*	Per Capita Income (\$)*	Persons in the Civilian Labor Force (%)	Persons below Poverty Level (%)	Median Home Value (\$)*
Humboldt	26.4	40,515	23,262	60.5	18.4	328,100
Del Norte	14.2	35,861	18,276	47.3	20.3	252,600
Mendocino	23.0	43,307	23,685	60.0	16.8	443,600
North Coast	21.2	39,894	21,741	55.9	18.5	341,433
California	29.4	61,154	43,641	64.8	12.9	510,200
United States	27.4	52,175	40,208	65.2	13.2	192,400

*Income is reported in 2008 inflation-adjusted dollars.

Source: BEA 2009; U.S. Census Bureau, American Community Survey 2009

Unemployment rates are consistently much higher for the counties of Humboldt, Del Norte, and Mendocino than for the State of California as a whole (Figure 2-1). Analysts project that job opportunities are most likely to increase in the information technology and financial sectors (EDD 2009a).

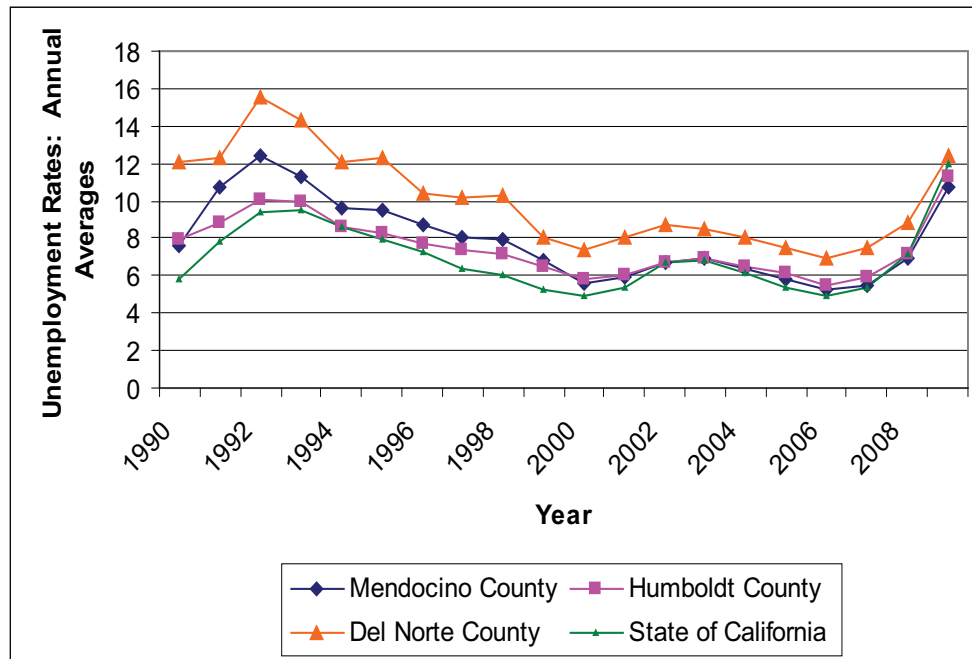


Figure 2-1 Unemployment Rates for the North Coast Region by County: 1990-2009

Source: <http://www.calmis.ca.gov/file/lfhist/mendohlf.xls>

2.1 Humboldt County

Geographic Overview. Humboldt County encompasses 4,053 square miles, including 480 square miles of water and 121 miles of coastline (U.S. Census Bureau 2009). Nearly 1,500,000 acres of Humboldt County are densely forested.

Population Trends. Historically, Humboldt County's population growth was closely linked to the growth of its timber industry. Between 1900 and 1940, the county's population increased from approximately 25,000 persons to 43,000 persons (Dean et al. 1973). During the post-War years, increasing national demand for wood products led to significant growth in the region's timber industry. Between 1940 and 1960, Humboldt County gained nearly 60,000 residents; the timber industry employed a significant portion of the workforce. During the 1960s, national demand for timber decreased. As a result, between 1960 and 1970, the county's population decreased from about 107,000 persons to 98,000 persons, reflecting a decline of eight percent (Dean et al. 1973).

Today, Humboldt County is the most populous of the three North Coast counties. The 2006-2008 interim Census enumerated 128,897 residents. More than half of the entire North Coast population resides in Humboldt County. Approximately 52 percent of Humboldt County's total population is concentrated along the coast in the communities of Eureka (26,128), Arcata (16,651), McKinleyville (13,599), and Fortuna (10,497). Small coastal and inland communities include Rio Dell (3,174), Ferndale (1,382), Shelter Cove (500), and Trinidad (311). Inland areas are sparsely populated. Between 1990 and 2006, the county population increased by eight percent, mainly in the aforementioned coastal communities (U.S. Census Bureau 2009).

Native American people from eight tribal groups comprise six percent of the county's total population (Figure 2-2) (U.S. Census Bureau 2009). Eighty-two percent of Humboldt County residents are Caucasian; eight percent are Hispanic⁹ (U.S. Census Bureau 2009).

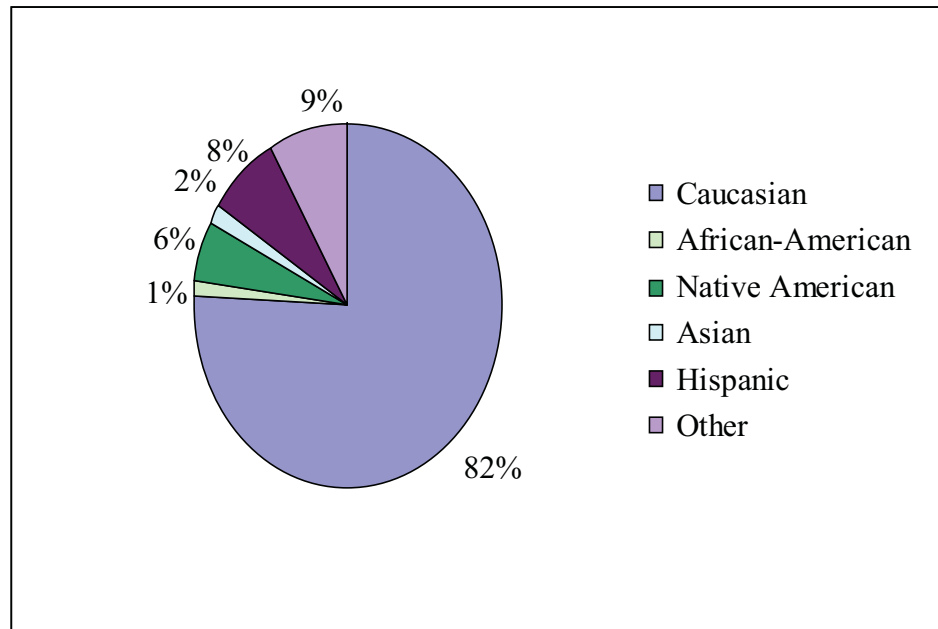


Figure 2-2 Principal Racial Groups in Humboldt County: 2006-2008

Source: U.S. Census Bureau 2009

Current Economic Trends. Humboldt County ranks lower than the State of California on all indicators of socioeconomic status considered here. The percentage of persons living below the poverty threshold in Humboldt County and in the City of Eureka is particularly high (Table 2-4).

Table 2-4 Select Demographic Factors: Humboldt County and Eureka, 2006-2008

Select Demographic Factors	Humboldt County	City of Eureka	State of California
Civilian Unemployment Rate (%)*	12.2	13.0	12.8
BA Degree or Higher (%)	26.4	22.5	29.4
Persons below Poverty Level (%)	18.4	20.3	12.9
Median Household Income (\$)**	40,515	43,603	61,154
Per Capita Income (\$)**	23,262	21,177	43,641

*EDD unemployment rates are for February 2010; ** Incomes are in 2008 inflation-adjusted dollars;

Source: BEA 2009; U.S. Census Bureau, American Community Survey 2009

Key Sectors of the Humboldt County Economy. The region's natural resources are of historic significance to the economic well-being of people of Humboldt County. Timber production figured prominently in the county's economy from the mid-1800s through the mid-1980s. Commercial fishing, mining, tourism, agriculture, and sport fishing have also been significant contributors to the county's economy.

⁹ Persons of Hispanic origin may be of any race; therefore, percentages describing racial composition exceed 100.

Timber. The manufacture of timber and other forest products¹⁰ in Humboldt County dates back to 1851. Several mills were developed along Humboldt Bay near existing railways and docks to facilitate timber exportation, and timber production rose steadily through the 1920s (Planwest Partners Inc. 2008; Vaux 1955). Production expanded once again during the mid-1940s, when post-war demand for timber increased. The rapid depletion of old-growth redwood forests in other areas of the Pacific Northwest brought many timber men to Humboldt County to exploit previously untapped stands of Douglas fir trees. By 1953, 180 sawmills were in operation in Humboldt County (Vaux 1955). The forest products industry employed nearly 25 percent of the Humboldt County workforce in 1971. However, unsustainable levels of production combined with the establishment of the 131,983-acre Redwood National Park in 1969 to significantly reduce timber production and the number of jobs available to county residents. By 2000, many of the county's lumber manufacturing facilities had been abandoned, and the number of operating sawmills in Humboldt County dropped to 12 (Morgan et al. 2004). Presently, timber production is one-third that of the mid-1980s, diminishing from nearly 700,000 thousand board feet (MBF) in 1984 to just under 230,000 MBF in 2008 (California Board of Equalization 2009). Employment in the forest products industry has dropped commensurately (Stewart 2007).

Commercial, Recreational, and Subsistence Fishing. Commercial and recreational fishing have long been important to residents of Humboldt County; the commercial and recreational salmon fisheries date to the mid-1800s. By the late 1940s, several seafood processing plants were located around Humboldt Bay (Planwest Partners Inc. 2008). Today, an economically significant commercial fishing fleet operates from Eureka, along with two seafood processing facilities and four buyers (Pomeroy et al. 2010). Additionally, some 7,200 recreational vessels are registered in Humboldt County, and many residents fish from the shoreline. The region's principal fisheries generate extensive revenue for coastal communities and the county, not only through ex-vessel sales, but also via seafood processing and distribution and the use of the harbor and fishery support businesses.

The five primary ports of landing in Humboldt County are: Trinidad, Eureka, Fields Landing, King Salmon, and Shelter Cove. The California Department of Fish and Game considers the ports of Eureka, Fields Landing, and King Salmon as part of the Humboldt Bay or "Eureka-area" complex, for purposes of landings data collection. Shelter Cove is located about 60 miles south of Eureka. Trinidad is roughly 30 miles north of Eureka. The port of Eureka is the only deepwater port between San Francisco and Coos Bay, Oregon.

In 2008, Eureka was the third leading port in the State of California in terms of ex-vessel value, and fourth in terms of landings (NMFS 2008). Some 140 captains offloaded 14 million pounds of seafood at Eureka receiving and processing facilities, with a nominal ex-vessel value of \$10 million (PacFIN 2008¹¹). Currently, between 100 and 120 commercial vessel owners are based in Eureka (North Coast Strategy for Economic Development 2007; Pomeroy et al. 2010). Commercial fishery participants describe the resident fleet as including 80 crabbers, 15 to 20

¹⁰ Other forest products include veneer, plywood, and pulp.

¹¹ PacFin (Pacific Fisheries Information Network) was the nation's first federal-state cooperative regional fisheries data network.

salmon trollers, 8 to 10 trawlers, and 5 to 10 small miscellaneous vessels (Pomeroy et al. 2010). The pot/trap fishery for Dungeness crab is the most economically important commercial fishery in Humboldt County. Between 2000 and 2008, an annual average of 4.6 million pounds of Dungeness crab with a corresponding nominal ex-vessel value of \$7.6 million was offloaded at Humboldt County ports of landing (CDFG 2009).

Mariculture is an important sector of the county economy. Oysters have been farmed in Humboldt Bay since the mid-1800s (Planwest Partners, Inc. 2008). Production increased substantially in the 1950s. Currently, five businesses produce seed and adult oysters and clams in the area (Pomeroy et al. 2010). These firms produce an annual average of 75,000 gallons or 60 percent of oysters grown in California (Driscoll 2009; North Coast Strategy for Economic Development 2007). The majority of cultivation occurs in the northern portion of Humboldt Bay, also known as Arcata Bay (North Coast Strategy for Economic Development 2007). Currently, Humboldt Bay is the only site in the study region with a thriving mariculture industry.

Members of seven Rancherias or reservations in Humboldt County use local marine resources for subsistence, ceremonial, or other purposes. Members of non-resident tribal groups also make seasonal trips to the area to fish and /or gather living marine resources along the coastline.

Agriculture. Production of crops and livestock contribute substantially to the Humboldt County economy (U.S. Department of Agriculture 2007). The value of all agricultural crops and products harvested in Humboldt County was \$228 million in 2008 (County Farm Bureau Federation 2008). The most valuable agricultural products of 2008 were: timber (\$104,797,000), nursery products (\$49,117,000), milk (\$20,674,000), and cattle and calves (\$19,816,000) (County Farm Bureau Federation 2008). Of the three North Coast study counties, the Humboldt County agricultural industry is the most prolific, in terms of value. The total value of crops and products in Humboldt County ranked 31 out of 58 counties in the State of California in 2008 (County Farm Bureau Federation 2008).

The extent to which the county's agricultural endeavors can be expanded is limited by steep inland mountain ranges, narrow river valleys and flood plains, and a scarcity of flat land. As such, most agricultural activity occurs on the relatively flat land along the coastal zone (Dean et al. 1973).

Tourism. Camping, fishing, hiking, wildlife viewing, and marine-related recreation are important resident and non-resident activities in Humboldt County. Development of a more robust tourism industry is challenged by the county's geographic isolation from major cities and the absence of a major airport. Nevertheless, tourism is an economically important and growing industry for the county (North Coast Strategy for Economic Development 2007). Popular coastal destinations include the Humboldt Redwoods State Park, the Redwood National Park, state campgrounds, reserves, rivers, beaches, and recreation areas.

According to the California Travel Impact Report prepared by Dean Runyan Associates, average annual travel spending by visitors to Humboldt County increased three percent between 1992 and 2007.¹² In comparison, the average annual travel spending by visitors to the State of

¹² Travel spending includes accommodations, food, retail sales, transportation/fuel, entertainment and recreation.

California as a whole increased four percent during that same period. In 2007, the county's tourism industry employed 4,770 persons, or 6.5 percent of the county's total workforce, and accounted for 3.6 percent of total employee earnings. In that same year, the Humboldt County-based travel industry accounted for \$294 million in sales. Tourist-generated state sales tax receipts amounted to \$7.5 million of the county's total receipts of \$102.6 million (Dean Runyan Associates 2009).

Current Employment Trends. Unemployment levels in Humboldt County are both chronically and seasonally elevated. Employment in many of the county's key industries – logging, commercial fishing, sport fishing, coastal tourism, and agriculture – is highly seasonal, with peak activity co-occurring during the summer months. Thus, county unemployment levels are highest in the winter months when these activities decline.

In December 2009, the rate of unemployment in Humboldt County was 11.5 percent, reflecting an increase of 3.8 percent from unemployment rates in December 2008 (Figure 2-3) (EDD 2009b). By February 2010, the rate of unemployment in the county had climbed to 12.2 percent. Unemployment rates were particularly high in the coastal communities of Arcata (11.5 percent), Eureka (13 percent), and McKinleyville (14 percent) (EDD 2010a).

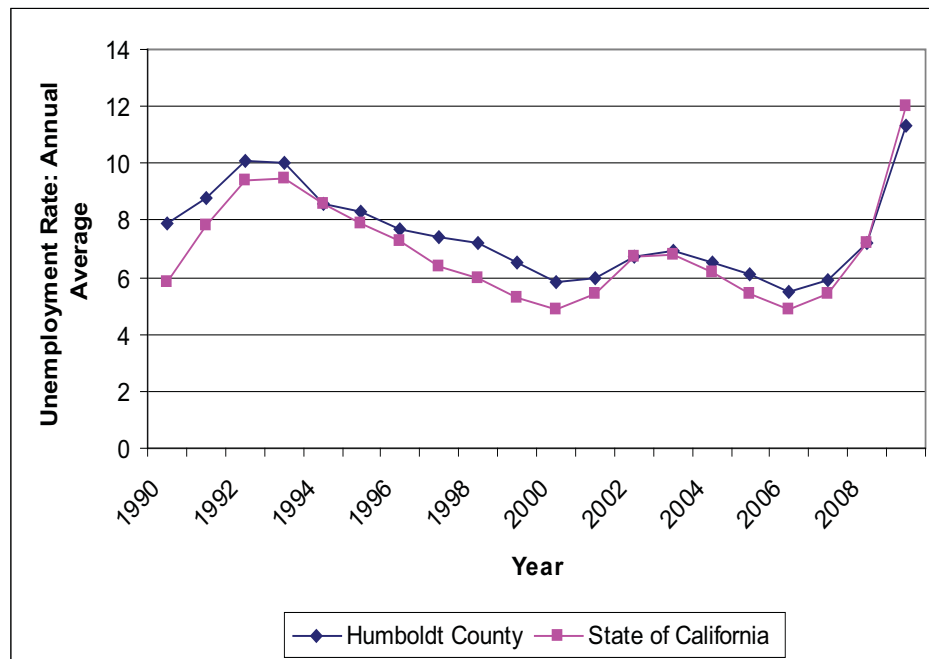


Figure 2-3 Unemployment Rates for Humboldt County: 1990-2009

Source: Employment Development Department 2010a

The national recession has accelerated Humboldt County's general trend of high unemployment rates, declining industries, and increasing impoverishment. Between October 2008 and October 2009, total Humboldt industry employment decreased by 2,600 jobs, ending the year with 46,900 jobs. Workers in the education and health services sector gained jobs; persons in nearly all other sectors lost jobs. No change occurred in the number of farm jobs (Table 2-5) (North Coast Prosperity Network 2009).

Table 2-5 Changes in Number and Percent of Jobs in Humboldt County: 2008-2009

Industry/Sector	October 2008	October 2009	Change in Number of Jobs between October 2008-2009	Percent of Change between October 2008-2009
Education & Health Services	5,900	6,100	+200	+3.4
Farm	1,200	1,200	0	0
Trade, Transportation, & Utilities	9,600	8,800	-800	-8.3
Government	14,200	13,500	-700	-4.9
Retail Trade	7,200	6,700	-500	-6.9
Construction	2,500	2,100	-400	-16.0
Leisure and Hospitality	5,100	4,800	-300	-5.9
Manufacturing	2,800	2,600	-200	-7.1
Wholesale Trade	1,000	900	-100	-10.0
Mining and Logging	600	500	-100	-16.7
Information	700	600	-100	-14.3
Financial Activities	1,800	1,700	-100	-5.6
Professional & Business Services	3,300	3,200	-100	-3.0
Total: All Industries	49,500	46,900	-2,600	-5.3

Source: EDD 2010a

Educational and health care services sectors employed 24 percent of the workforce in 2008. Other key sectors include retail trade, tourism, and construction (Figure 2-4). Government is also a major sector, providing employment to 22.2 percent of all workers.

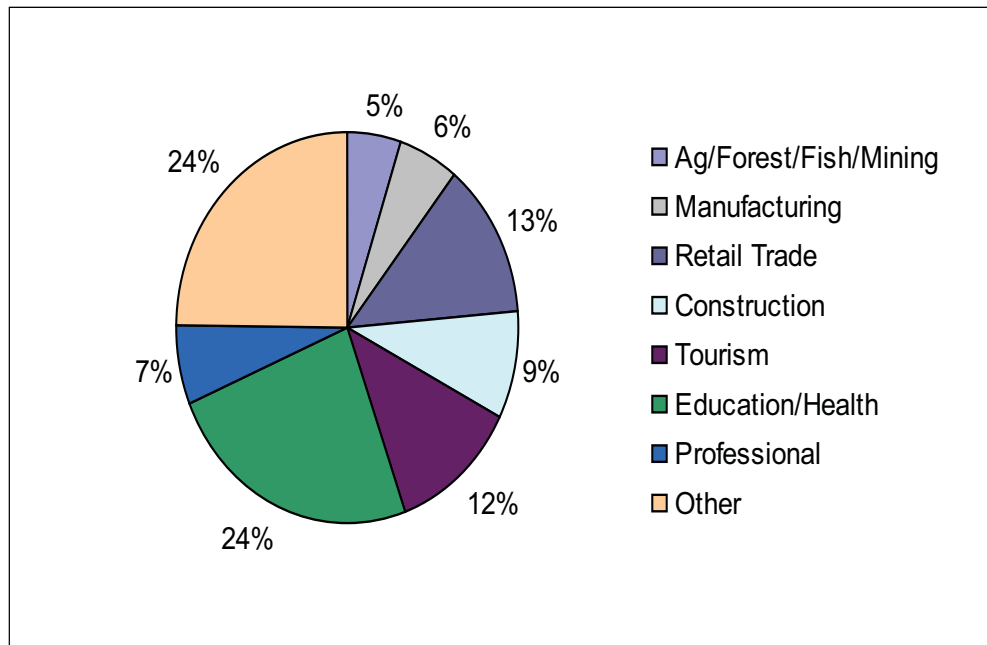


Figure 2-4 Employment by Select Industries, Humboldt County: 2006-2008

Source: U.S. Census Bureau 2009

Major Employers. The most significant occupational sectors in Humboldt County are management, sales and office, and services (Figure 2-5). The services and management sectors show the most extensive growth from 1990, increasing 34.7 percent and 25.4 percent, respectively. Employment in the sales and office sector has decreased 10 percent since 1990.

According to statistics available to the U.S. Census Bureau (2009), employment in the farming, fishing and forestry sector declined by half from 1990 employment figures. However, it is important to note that statistics for self-employed persons, including fishing captains, is not adequately captured in the Census database.

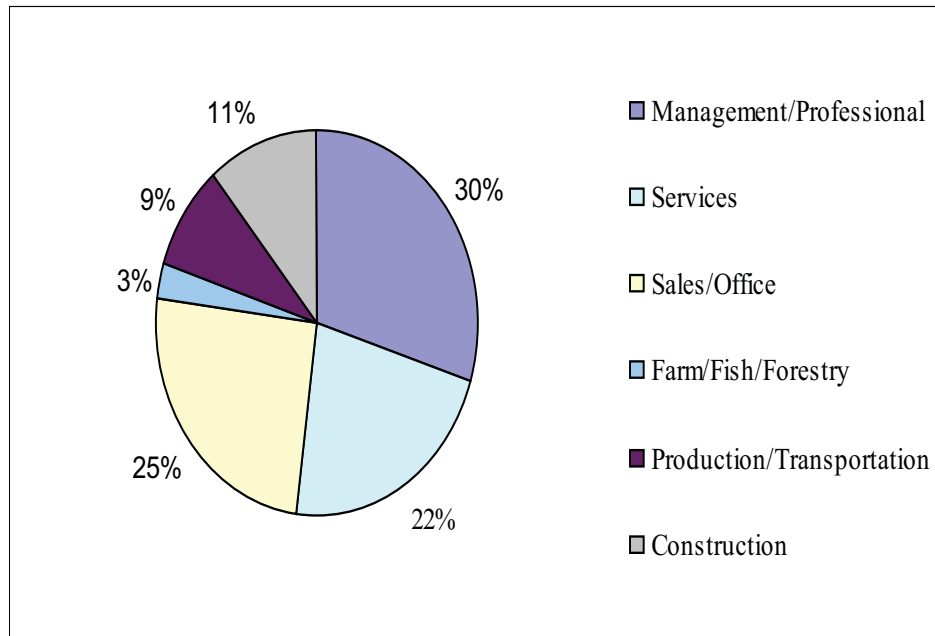


Figure 2-5 Employment by Occupation, Humboldt County: 2006-2008
Source: U.S. Census Bureau 2008

Today, the largest employers in coastal Humboldt County are in the education, health, and social services sector. Humboldt State University and St. Joseph Hospital employ large numbers of workers (Table 2-6).

In the county's adjacent inland communities, the dominant industries are retail trade, education and research, and tourism. Timber (lumber and wood products), dairy products, fisheries and aquaculture, specialty agriculture and horticulture, manufacturing, arts and culture, and information and technology are also important economic sectors and sub-sectors (North Coast Prosperity Network 2009).

Table 2-6 Major Employers in Humboldt County: 2010

Employer Name	Location	Industry/Business Description	Employer Size Class
Humboldt County Health Department	Eureka	County Government/Public Health Programs & Crisis Intervention Services	100-249
Humboldt County Sheriff Department	Eureka	Sheriff	100-249
Six Rivers Youth Football	Eureka	Child and Youth Services	100-249
Bettendorf Trucking	Arcata	Trucking	250-499
Blue Lake Casino	Blue Lake	Casinos/Gambling	250-499
Caltrans	Eureka	State Government/Transportation Programs	250-499
Eureka City Clerk	Eureka	City Government/Executive Offices	250-499
Humboldt County Education Office	Eureka	County Government/Education Programs	250-499
Sierra Pacific Industries	Arcata	Lumber Manufacturers	250-499
Humboldt County Social Service Department	Eureka	County Government/Social & Human Resources	500-999
Mad River Community Hospital	Arcata	Hospitals	500-999
Humboldt State University	Arcata	Universities & College Academic	1,000-4,999
St. Joseph Hospital	Eureka	General Medical and Surgical Hospital	1,000-4,999

Source: EDD 2010b

2.2 Del Norte County

Geographic Overview. Del Norte is the northernmost county in the State of California. It encompasses a total of 1,230 square miles of land and 222 square miles of lakes, rivers, and estuaries. It is the smallest of the three North Coast counties.

Population Trends. Del Norte is the least populous but fastest growing county in the North Coast region. Between 1990 and 2008, the county's population grew from 23,460 persons to 28,870 persons, an increase of 23 percent (U.S. Census Bureau 2008). Crescent City, the county's largest coastal community and only incorporated city, had a population of 4,006 persons in 2000 (U.S. Census Bureau 2000). The county's only port of landing, Crescent City Harbor, is also located in Crescent City. Adjacent coastal communities and their year 2000 populations include Smith River (2,003) and Klamath (651); populations are not available for nearby Requa and Fort Dick.

The discovery of gold along the Trinity River in 1850 and Myrtle Creek in 1853 precipitated the first major influx of non-Native Americans into the county. Many settled in the Crescent City area near the bay, which was first utilized as a port of entry for supplies and later as a shipping port for timber. Homesteaders continued to arrive in the area following the establishment of the county's first commercial lumber mill in the mid-1850s.

The majority of residents in Del Norte County are Caucasian; however, this county is the most ethnically diverse of the three North Coast counties. Persons of Native American descent comprise nine percent of the Del Norte population; Hispanics account for 16 percent (Figure 2-6).

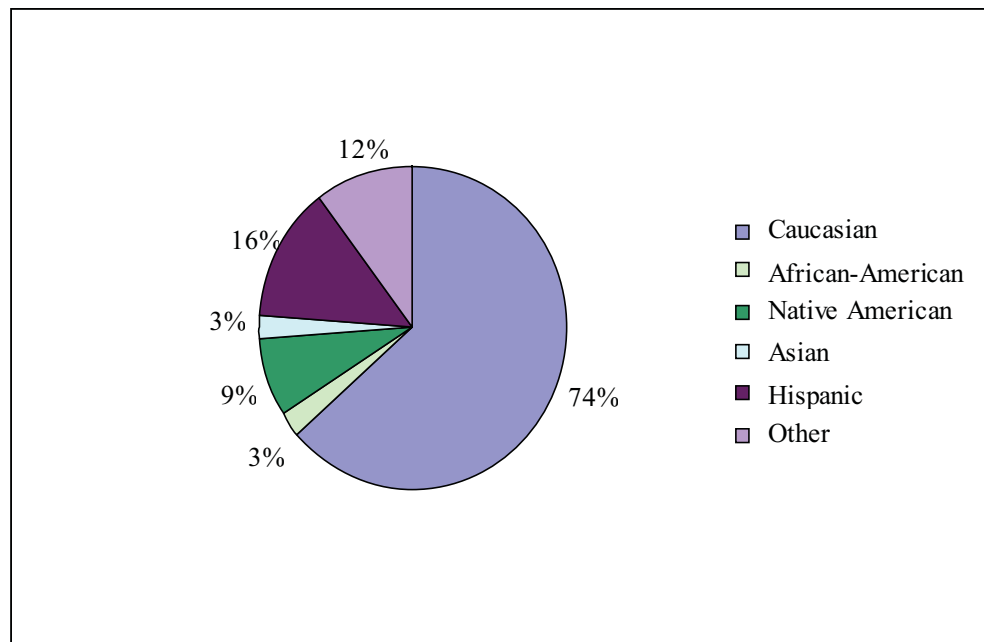


Figure 2-6 Principal Racial Groups in Del Norte County: 2006-2008

Source: U.S. Census Bureau 2009

Archeological evidence indicates the presence of the Yurok and Tolowa tribes in the North Coast region thousands of years prior to the arrival of non-Native American settlers in the 1850s. Members of the Yurok Tribe harvest relatively large amounts of Chinook and coho salmon and other resources in the Klamath River Basin (Pierce 2002). Similarly, marine resources such as smelt and salmon, clams, mussels, eels, and kelp have long been of dietary importance to the Tolowa tribe (Collins 1996; Thornton 1984).

Current Economic Trends. Del Norte County ranks lower than the State of California on all indicators of socioeconomic status considered here. In the North Coast study region, Del Norte County has the highest percentage of persons living below the poverty threshold: 20 percent of Del Norte County residents and nearly 35 percent of Crescent City residents were living below the poverty threshold in 2008. Median household income for the county also falls well below the state average (Table 2-7) (U.S. Census Bureau 2009). According to Stewart (2007), geographic isolation from a major metropolitan area and a decline in relatively high wage manufacturing jobs partially account for the below average median household income level.

Table 2-7 Select Demographic Factors: Del Norte County, 2006-2008; Crescent City 2000†

Select Demographic Factors	Del Norte County	Crescent City	State of California
Civilian Unemployment Rate (%)*	13.6	17.1	12.8
BA Degree or Higher (%)	14.2	13.3	29.4
Persons below Poverty Level (%)	20.3	34.6	12.9
Median Household Income (\$)***	35,861	25,783	61,154
Per Capita Income (\$)***	18,276	16,434	43,641

† 2008 American Community Survey data is only available for communities with populations of 20,000 or more.

*EDD unemployment rates are for February 2010 ** Income is in 2008 inflation-adjusted dollars

Sources: EDD 2010b; U. S. Census Bureau 2009

Key Sectors of the Del Norte County Economy. Historically, minerals, timber, and marine products were central to the economy of Del Norte. While natural resource extraction industries remain economically significant to the county, fewer Del Norte County residents work in those occupations today than in recent past decades (Stewart 2007). Sawmills, which were once numerous in Del Norte County, are now closed. The size of the county's commercial fishing fleet has greatly diminished. Today, the service industry, which includes tourism, is the county's largest and fastest growing industry, in terms of employment (County of Del Norte 2006).

Timber. In the early 1970s, the Del Norte County timber harvest accounted for 6.5 percent of California's total annual timber harvest. The forest products industry employed 25 percent of the county's workforce. Establishment and subsequent expansion of Redwood National Park combined with untenable levels of production to significantly diminish regional timber production and the number of jobs available to county residents. Currently, two wood products facilities operate in the county. The forest products industry employed 4.4 percent of the county's total workforce in 2000. In that same year, timber felled from Del Norte County forests accounted for 2.2 percent of California's total annual timber harvest. This yield was 86 percent below the 1972 harvest (Headwaters Economics 2009; Morgan et al. 2004). By 2008, the Del Norte County timber harvest accounted for less than one percent of the state's total annual timber harvest (California Board of Equalization 2009).

Commercial Fishing. The commercial fishing industry in Del Norte County began in the 1860s. Salmon was the principal species targeted. The economic importance of the fishing industry to the county and its residents increased as the timber industry began to decline in the mid-1900s (Norman et al. 2006). Today, the county's commercial fishing industry centers on Dungeness crab, sablefish, black rockfish, ocean (pink) shrimp, and Pacific whiting.

Crescent City Harbor is the only commercial port of landing in Del Norte County. In 2008, Crescent City Harbor was the fourth leading port in the State of California in terms of ex-vessel value, and fifth in terms of landings (NMFS 2008). In 2000, 200 captains delivered their catch to Crescent City Harbor (Norman et al. 2006). More than 75 percent of those captains offloaded Dungeness crab only, or as part of an annual round that includes other species, such as groundfish or salmon. The sole large-scale processor in Crescent City processes and wholesales multiple species. Currently, about 140 captains offload at the harbor (PacFIN 2008).

The number of commercial vessels docking at one of the harbor's 238 permanent slips has significantly declined in recent years. This decline is largely attributed to current regulations

addressing changing resource conditions in various groundfish and Klamath River Fall Chinook salmon populations.

Agriculture. Crops and livestock production are moderately important to the economy of Del Norte County (U.S. Department of Agriculture 2007). The value of all agricultural crops and products harvested in Del Norte County during 2008 was \$52.6 million (County Farm Bureau Federation 2008). The most valuable agricultural products were: cows (\$11,964,000), milk (\$10,590,000), lily bulbs (\$7,990,000), and timber (\$5,165,000) (County Farm Bureau Federation 2008). Relative to the value of crops and products produced in other counties, Del Norte County's crops and products ranked 44 out of 58 counties in 2008.

Tourism. The Del Norte tourist industry centers on outdoor activities and marine recreation such as camping, fishing, hiking, biking, kayaking, rafting, and bird watching. Popular destinations include the Tolowa Dunes State Park, the Redwoods National Park Headquarters and Visitor Information Center, the Smith River National Recreation Area, and the Elk Creek Wildlife area. The county's tourism industry growth is undermined by its relative remoteness and rugged topography.

According to the California Travel Impact Report prepared by Dean Runyan Associates, the average annual travel spending by visitors to Del Norte County increased by almost three percent between 1992 and 2007; four percent was average for the state as a whole. In 2007, the county's tourism industry employed 1,760 persons, or nearly 15 percent of the county's total workforce, and accounted for 10 percent of total employee earnings. In that same year, the travel industry in Del Norte accounted for \$102 million in sales. The county's tourist-generated state sales tax receipts amounted to \$2.7 million of its total receipts of \$14.2 million (Dean Runyan Associates 2009).

Current Employment Trends. Unemployment rates in Del Norte County have long exceeded the state average (Figure 2-7). In February 2010, the unemployment rate in Del Norte County was nearly 14 percent (EDD 2010b). In Crescent City, the unemployment rate was 17 percent (EDD 2010c). A local county official links Del Norte's high unemployment rates and poverty levels to the decline of the county's timber and fishing industry (Atherton 2009). Employment here is also highly seasonal, with unemployment rates typically peaking in the winter months when tourist-related traveling and spending are down (Headwaters Economics 2009).

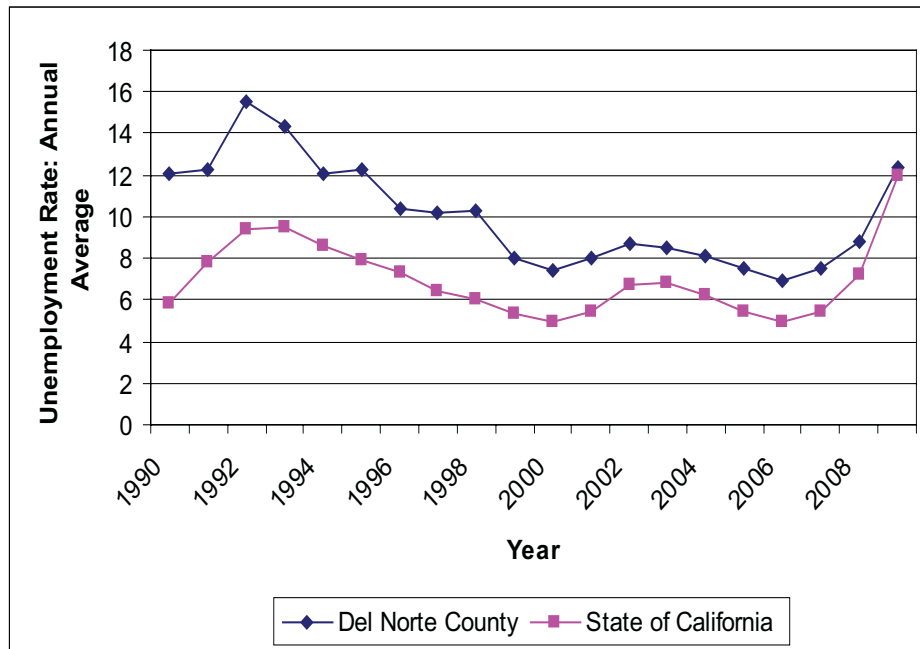


Figure 2-7 Unemployment Rates for Del Norte County: 1990-2009
Source: EDD 2010d

The national recession has accelerated Del Norte County's general trend of high unemployment rates, declining industries, and increasing impoverishment. Between December 2008 and December 2009, total Del Norte County industry employment decreased by 270 jobs or 3.2 percent, ending the year with 8,200 jobs (EDD 2010b). Workers in the manufacturing, financial activities, and mining, logging, and construction sectors gained jobs; persons in most other sectors lost jobs (Table 2-8).

Table 2-8 Changes in Number and Percent of Jobs in Del Norte County: 2008-2009¹³

Industry/Sector	December 2008	December 2009	Change in Number of Jobs between December 2008-2009	Percent of Change between December 2008-2009
Manufacturing	130	140	+10	+7.7
Mining, Logging, and Construction	270	280	+10	+3.7
Financial Activities	200	210	+10	+5.0
Information	110	110	0	0.0
Professional and Business Services	160	160	0	0.0
Leisure and Hospitality	850	850	0	0.0
Retail Trade	1,016	984	-32	-3.1
Farm	330	270	-60	-3.0
Wholesale Trade	1,000	900	-100	-10.0
Government	3,940	3,840	-100	-2.5
Education and Health Services	1,200	1,150	-850	-4.2
Trade, Transportation, and Utilities	1,200	1,150	-850	-4.2
Total, All Industries	8,470	8,050	-420	-4.9

Source: EDD 2010d

¹³ Data do not necessarily include seasonal or contract labor and crew.

Thirty percent of the workforce was employed in education and health care services in 2008. Other key sectors include tourism and retail trade (Figure 2-8). Government is also a major sector, employing 38.6 percent of all workers.

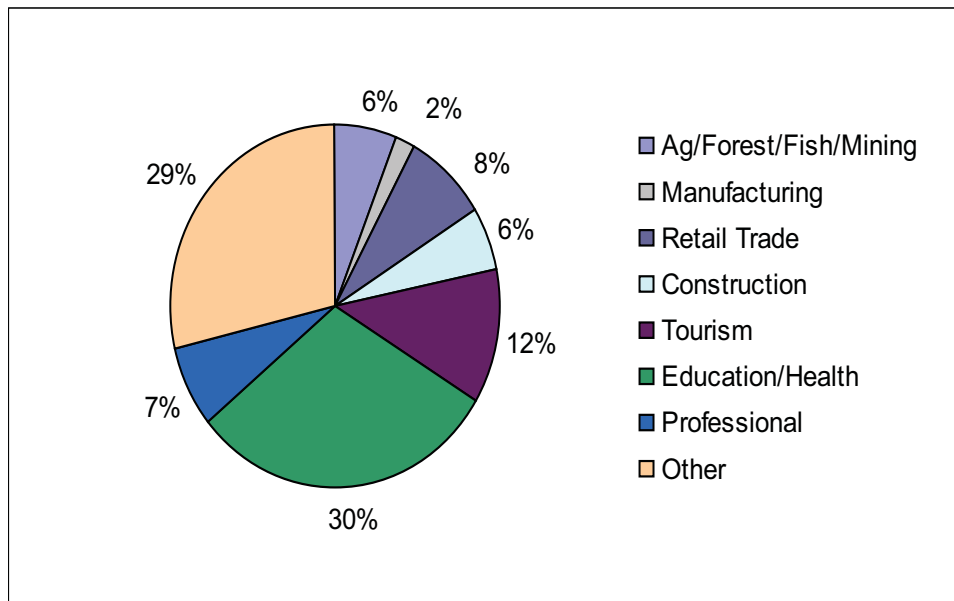


Figure 2-8 Employment by Select Industries, Del Norte County: 2006-2008
Source: U.S. Census Bureau 2009

Major Employers. The most significant occupational sectors in Del Norte County are services, management, and sales and office (Figure 2-9). The services sector shows the most extensive growth since 1990, increasing from 22 percent to 38 percent. Employment in the farming, fishing and forestry sector decreased by nearly three percent from 1990 employment figures (U.S. Census Bureau 2009).

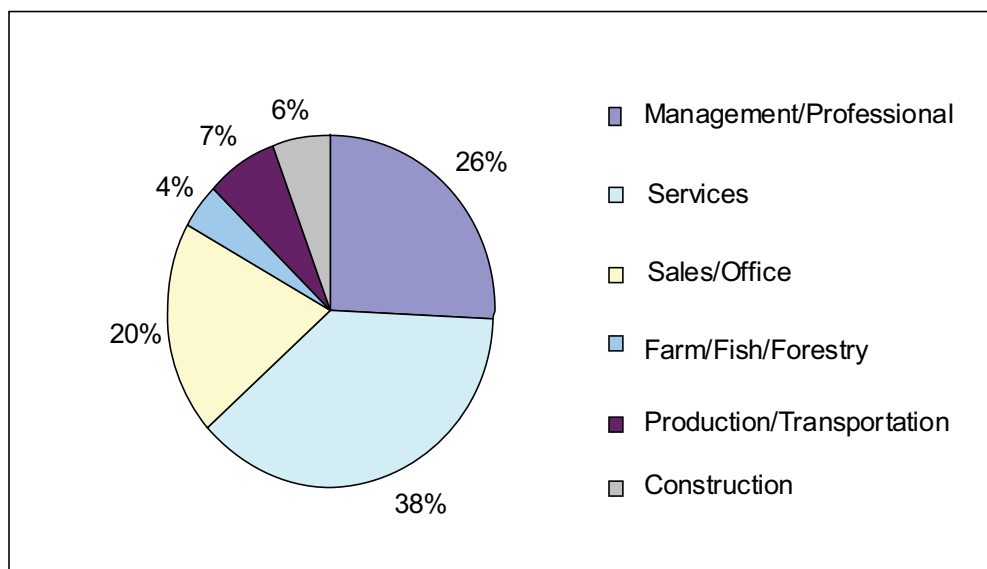


Figure 2-9 Employment by Occupation, Del Norte County: 2006-2008
Source: U.S. Census Bureau 2008

Pelican Bay State Prison is the largest employer in Del Norte County. In 2006, prison jobs accounted for approximately 1,500 jobs or 18 percent of total county employment (California Department of Corrections and Rehabilitation 2009). The other major employers in coastal Del Norte County typically employ between 50 and 249 people. Most of those businesses are located in Crescent City. Other than the prison, Sutter Coast Hospital is the only business in Crescent City with more than 250 employees (Table 2-9).

Table 2-9 Major Employers in Del Norte County: 2010

Employer Name	Location	Industry/Business Description	Employer Size Class
Crescent City Nursing and Rehabilitation	Crescent City	Nursing and Convalescent Homes	100-249
Del Norte County Social Services	Crescent City	County Government-Social/Human Resources	100-249
Elk Valley Casino	Crescent City	Casinos	100-249
Hambro Forest Products, Inc.	Crescent City	Building Materials	100-249
Home Depot	Crescent City	Home Centers	100-249
Lucky 7 Casino	Smith River	Casinos	100-249
Palmer Westbrook	Smith River	Agricultural Products	100-249
WalMart	Crescent City	Department Store	100-249
Yurok Tribe	Klamath	Native American Reservations & Tribes	100-249
Sutter Coast Hospital	Crescent City	Hospitals	250-499
Pelican Bay State Prison	Crescent City	Correctional Institution	1,000-4,999

Source: EDD 2010e

2.3 Mendocino County

Geographic Overview. Mendocino encompasses 3,510 square miles of land and 369 square miles of lakes, rivers, and estuaries. The county's rocky and rugged coastline spans approximately 100 miles. Noyo Harbor, located just south of the City of Fort Bragg, is the largest harbor in the county.

Population Trends. Like Humboldt and Del Norte Counties, Mendocino County is a rural area. Many of its population centers are small and unincorporated. The 2006-2008 interim Census enumerated a total of 86,184 residents, reflecting a ten percent increase since the 1990 Census (U.S. Census Bureau 2009). Incorporated towns include: Fort Bragg (7,026) Point Arena (474), Willits (5,073), and Ukiah (15,497) (U.S. Census Bureau 2000).

The Noyo area was first settled as a small lumber town in 1852 (Scofield 1954). More small lumber mills and ranches were established along the banks of coastal creeks and rivers in the greater Fort Bragg area in 1867. The Noyo/Fort Bragg population remained small until the completion of a railroad line between Fort Bragg and Willits in 1916, which facilitated expansion of the region's timber and commercial fishing industries. The harbor's importance as a center for commercial salmon fishing continued to grow throughout much of the 20th century.

The majority of residents in Mendocino County are Caucasian. Hispanics comprise the next largest ethnic category and constitute the fastest growing segment of the county's population.

Between 1990 and 2006, the Hispanic population increased by 72 percent. Native American groups comprise five percent of the population (Figure 2-10) (U.S. Census Bureau 2009).

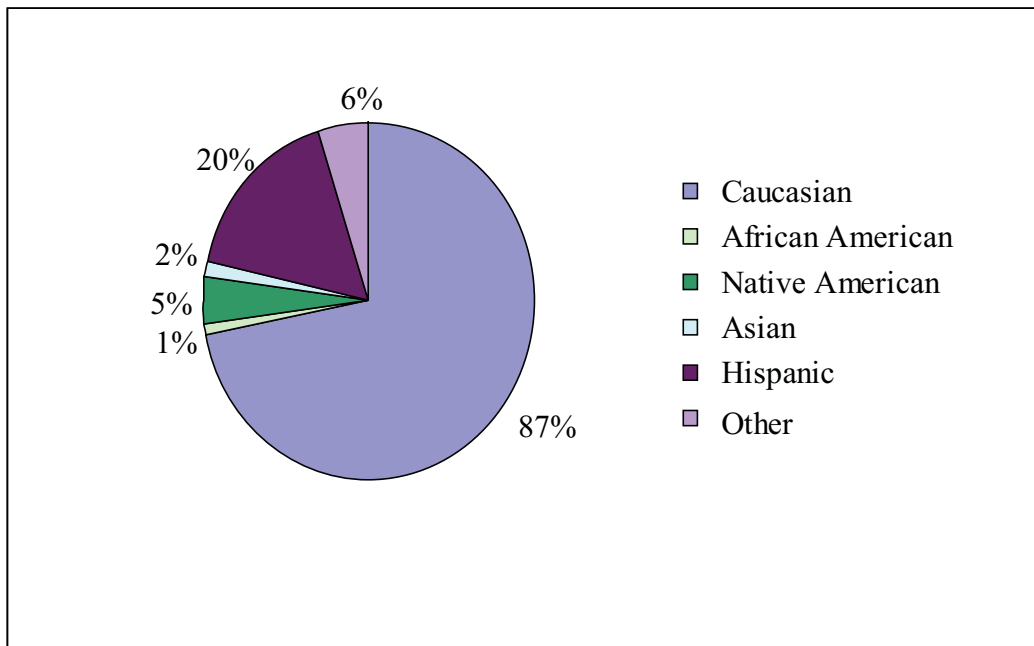


Figure 2-10 Principal Racial Groups in Mendocino County: 2006-2008

Source: U. S. Census Bureau 2009

The Pomo Indians are the earliest known inhabitants of northern Mendocino County. These hunter-gatherers relied extensively on coastal and riverine resources, including salmon, marine shellfish, and marine mammals (Norman et al. 2007). Today, the Pomo Indians live in many rancherias located across several counties in Northern California. In Mendocino County, at least nine tribes or tribal communities have an interest in maintaining access to coastal resources for subsistence and other cultural purposes. Although they live inland, aquatic products remain significant to their daily diet today (Pritzker 2000).

Current Economic Trends. Mendocino County ranks lower than the State of California on all indicators of socioeconomic status considered here (Table 2-10). In 2008, nearly 17 percent of Mendocino County residents and 20 percent of Fort Bragg residents were living below the poverty threshold. Per capita personal income and median household income both fall below state averages as well (U.S. Census Bureau 2009).

Key Sectors of the Mendocino County Economy. Timber and marine resources are of historic significance to the people of Mendocino County. Agriculture, especially viticulture, and tourism are also economically important Mendocino County industries.

Table 2-10 Select Demographic Factors: Mendocino County, 2006-2008; Fort Bragg 2000†

Select Demographic Factors	Mendocino County	City of Fort Bragg	State of California
Civilian Unemployment Rate (%)*	12.5	13.9	12.8
BA Degree or Higher (%)	23.0	13.6	29.4
Persons below Poverty Level (%)	16.8	20.4	12.9
Median Household Income (\$) **	43,307	36,548	61,154
Per Capita Income (\$) **	23,685	20,275	43,641

†2006-2008 American Community Survey data is only available for communities with populations of 20,000 or more. *EDD unemployment rates are for February 2010. ** Income is in 2008 inflation-adjusted dollars.

Source: EDD 2010f; U.S. Census Bureau, American Community Survey 2009

Timber. In the early 1970s, the Mendocino County timber harvest accounted for nearly 10 percent of California's total annual timber harvest and the forest products industry employed approximately 23 percent of the county's workforce (Headwaters Economics 2009; Morgan et al. 2004). In the late 1970s, sharp declines in the U.S. housing and construction markets, increases in imported wood products, and restricted timber access –especially on federal lands– significantly diminished regional timber production and the number of jobs available to county residents.

In 2000, eight wood product facilities, including six sawmills, employed over four percent of the county's total workforce (Headwaters Economics 2009; Morgan et al. 2004). In that same year, the Mendocino County timber harvest accounted for nearly nine percent of California's total annual timber harvest. In 2008, the Mendocino County timber harvest amounted to almost seven percent of the state's total timber harvest for that year (California Board of Equalization 2009).

Commercial Fishing. Mendocino County has three main ports of landing: Noyo Harbor, Albion, and Point Arena. Landings are occasionally reported at the lesser ports of Westport, Elk, and Mendocino, but in relatively small amounts. Noyo Harbor is the leading commercial port in the county in terms of the volume of landings. Ocean salmon was the first commercial fishing industry at Noyo in the early 1900s. The introduction of motorized trolling vessels in the 1920s greatly increased salmon landing capacity (Norman et al. 2007). In the 1970s, at least 130 commercial fishermen utilized Noyo Harbor as their homeport. The majority of those resident fishermen trolled for salmon. Many more non-resident fishermen also trolled for salmon at Noyo. Trawl and crab fishermen were also active. Salmon landings dominated the catch offloaded at this port through the mid-1990s, when salmon abundance began to decline and seasonal closures were instituted to address that decline. Today, some 100 fishing operations offload their catch at this harbor (PacFIN 2009). Of those operations, approximately 80 utilize Noyo as their homeport. Primary commercial fisheries at Noyo Harbor currently include: the troll fishery for Chinook salmon; the trawl, hook-and-line, and trap fisheries for groundfish, including sablefish and nearshore rockfish; the urchin dive fishery; and the pot fishery for Dungeness crab. Other fisheries of lesser or past importance include the troll fishery for albacore tuna and the trawl fishery for pink shrimp, among others (Pomeroy et al. 2010). The number of processors in the Noyo Port District has declined from six to three between 1970 and 2008.

Agriculture. Production of crops and livestock contribute significantly to the Mendocino County economy (U.S. Department of Agriculture 2007). In 2008, the value of all agricultural crops and products harvested in Mendocino County was \$148 million (County Farm Bureau Federation 2008). The most valuable agricultural products were: wine grapes (\$62,047,000),

timber (\$39,209,000), pears (\$11,875,000), and cattle/calves (\$5,943,000) (County Farm Bureau Federation 2008). Relative to the value of the crops and produce in other California counties, the total value of Mendocino County's crops and products is moderately low, ranking 36 out of 58 counties in 2008.

Tourism. Tourism in Mendocino County is centered on outdoor activities and marine recreation such as camping, fishing, hiking, tide-pooling, and whale watching. The county features numerous state parks and beaches. Popular destinations include the Mendocino Headlands State Park, Manchester State Park, Mackerricher State Park, Sinkyone Wilderness State Park, Greenwood State Beach, and Glass Beach.

According to the 2008 California Travel Impact Report prepared by Dean Runyan Associates, the average annual travel spending by visitors to Mendocino County increased three percent between 1992 and 2007; spending increased four percent at the state level. In 2007, 5,290 persons, or 10 percent of the county's total workforce, worked in some sector of the Mendocino tourist industry and accounted for over seven percent of total employee earnings. In that same year, Mendocino County's travel industry generated \$326 million in sales. The county's tourist-generated state sales tax receipts amounted to \$8.3 million of its total receipts of \$76.4 million (Dean Runyan Associates 2009).

Current Employment Trends. Since 1990, the unemployment rates in Mendocino County have either exceeded or paralleled those of the state as a whole (Figure 2-11). In February 2010, the Mendocino County unemployment rate was 12.5 percent (EDD 2010f).

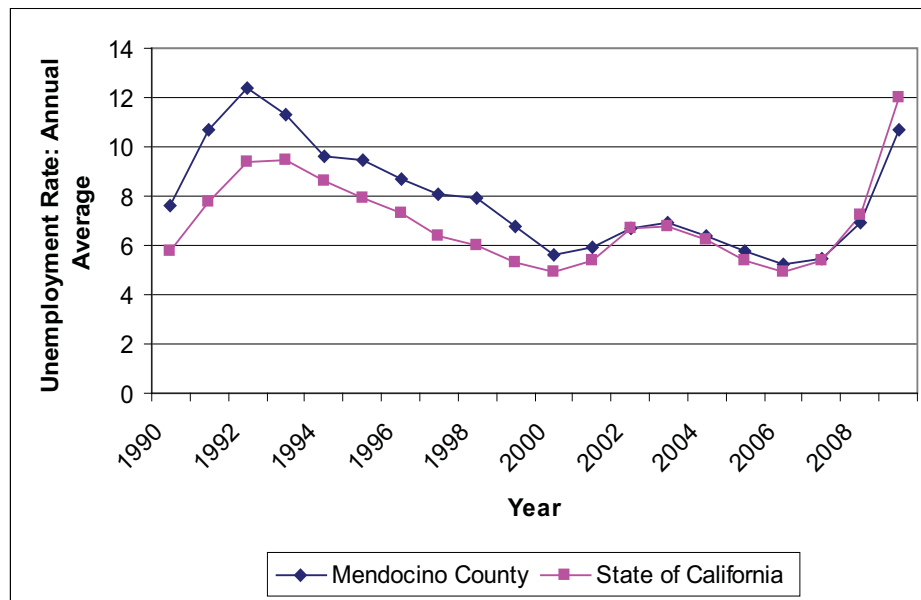


Figure 2-11 Unemployment Rates for Mendocino County: 1990-2009

Source: EDD 2009f

Between December 2008 and December 2009, total Mendocino County industry employment decreased by 1,730 jobs or 5.6 percent (EDD 2010f). Jobs were lost in nearly every sector. The financial activities sector was the only occupational field to gain jobs (Table 2-11).

Table 2-11 Changes in Number and Percent of Jobs in Mendocino County: 2008-2009

Industry/Sector	December 2008	December 2009	Change in Number of Jobs between December 2008-2009	Percent Change between December 2008-2009
Financial Activities	1,210	1,230	+20	1.7
Mining and Logging	210	210	0	0.0
Construction	1,240	1,110	-130	-10.5
Trade, Transportation, and Utilities	5,900	5,430	-470	-9.2
Leisure and Hospitality	3,770	3,400	-370	-9.8
Retail Trade	4,520	4,190	-330	-7.3
Government	7,710	7,380	-330	-4.3
Manufacturing	2,500	2,330	-170	-6.8
Farm	1,620	1,470	-150	-9.3
Wholesale Trade	730	660	-70	-9.6
Education and Health Services	3,780	3,730	-50	-1.3
Professional and Business Services	1,890	1,860	-30	-1.6
Information	370	360	-10	-2.7
Total: All Industries	30,920	29,190	-1,730	-5.6

Source: EDD 2009f

Twenty-one percent of the county workforce was employed in the education and health care services sector in 2008. Other key sectors include retail trade and tourism (Figure 2-12). Government is also a significant sector, providing employment to 19 percent of all workers.

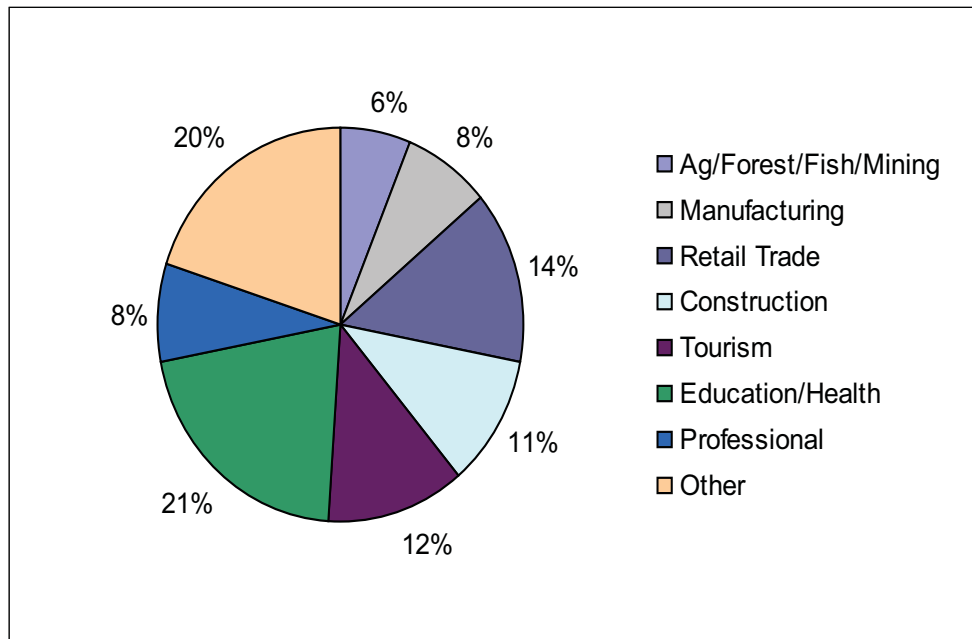


Figure 2-12 Employment by Select Industries, Mendocino County: 2006-2008

Source: U.S. Census Bureau 2009

Major Employers. The most significant occupational sectors in Mendocino County are management, sales and office, and services (Figure 2-13). The management and services sectors show the most extensive growth between 1990 and 2008, increasing 24 percent and 15 percent,

respectively. Employment in the farming, fishing, and forestry sector decreased by nearly five percent between 1990 and 2008 (U. S. Census Bureau 2009).

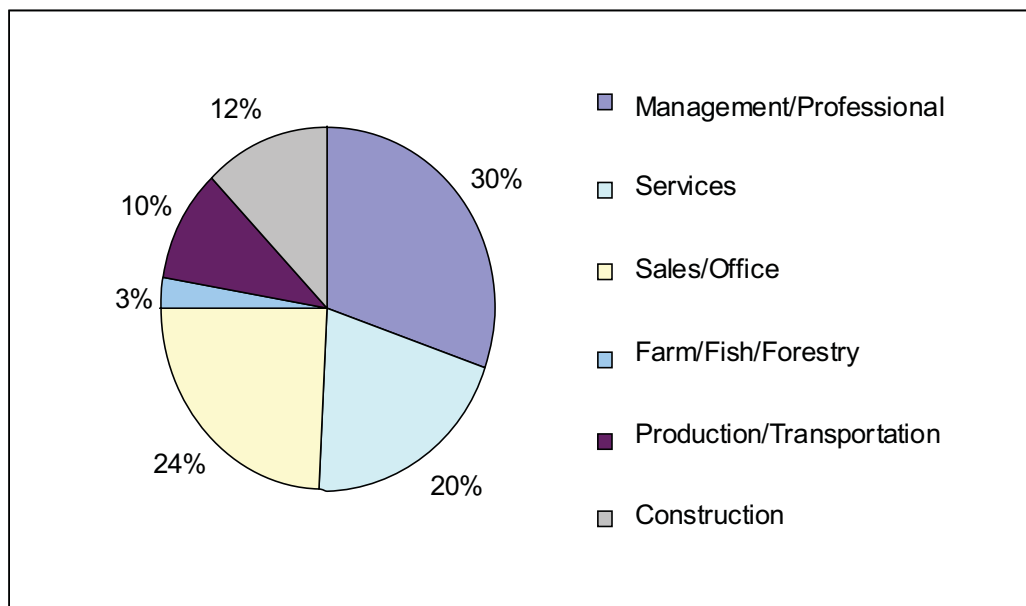


Figure 2-13 Employment by Occupation, Mendocino County: 2006-2008

Source: U.S. Census Bureau 2008

Today, large numbers of workers are employed in county government. The Coast District Hospital, and Safeway, a retail grocery store, are among the county's largest employers located in Fort Bragg (Table 2-12) (EDD 2010g).

Table 2-12 Major Employers in Mendocino County: 2010

Employer Name	Location	Industry/Business Description	Employer Size Class
City of Ukiah	Ukiah	Government Offices	100-249
Coyote Valley Shodakai Casino	Redwood Valley	Casinos	100-249
Food Help Program	Ukiah	Civil and Social Organizations	100-249
Forestry and Fire Protection	Willits	Government-Forestry Services	100-249
Mendocino County Office-EDCTN	Ukiah	Government Offices – County	100-249
Mental Health Services	Ukiah	Government Offices – County	100-249
MetalFX	Willits	Sheet Metal Fabricators - Manufacturing	100-249
Safeway	Fort Bragg	Grocers - Retail	100-249
Ukiah Campus	Ukiah	Colleges and Universities	100-249
Frank R. Howard Mem. Hospital	Willits	Hospitals	250-499
Hillside Health Center	Ukiah	Dentists	250-499
Mendocino Coast District Hospital	Fort Bragg	Hospitals	250-499
Mendocino County Coroner	Point Arena	Government Offices-County	250-499
Mendocino County Sheriff	Point Arena	Sheriff/Police Protection	250-499
Mendocino County Social Services	Ukiah	Government Offices-County	250-499

Source: EDD 2010g

3.0 Commercial and Recreational Fisheries of the North Coast

This chapter describes the commercial and recreational fisheries and associated industries of the North Coast, here defined to include the region extending from the Oregon-California border to Alder Creek in Mendocino County. The discussion is organized by county and port, with extensive discussion of the principal fishing harbors of the North Coast. These are: Trinidad, Eureka, and Shelter Cove in Humboldt County, Crescent City in Del Norte County, and Noyo and Albion in northern Mendocino County.

3.1 Participation and Production

Overview. The commercial fisheries of the North Coast vary in several respects, including principal species and gear; geographic distribution of effort; amount and value of landings; number of vessels moored in and/or delivering to particular ports; number and types of resident seafood dealers; nature and extent of supporting infrastructure; and so forth. Similarly, the recreational fisheries of the North Coast vary in terms of rates of places and rates of participation; principal species pursued; fishing gear and methods used; relative economic significance, etc.

This chapter uses multiple data sources to describe commercial and recreational fisheries as they are conducted from the various fishing ports of the North Coast. Multiple data streams are desirable given the inherent limitations of each.¹⁴ In some cases, interview data and data of observation are used to supplement, validate, and/or interpret information from state and federal agencies. In this case, PacFIN and CDFG data¹⁵ are particularly useful for estimating commercial fishing catch and effort over time. The chapter also benefits from and builds on the work of Pomeroy et al. (2009a,b and 2010a,b).

Resident and Non-Resident Commercial Fishing Vessels Combined. The overall number of commercial fishing vessels active in the State of California has declined precipitously since 1981. According to PacFIN, 6,908 vessels were active in the California fleet in 1981. By 2009, the fleet contracted to 1,914 active vessels.¹⁶ The North Coast component of the statewide fleet reached its peak in 1981 at 3,213 vessels. Approximately 375 vessels now participate. Fleet attrition has been particularly acute in recent years, with the overall California fleet diminishing by 30 percent between 2007 and 2009, and the North Coast fleet contracting by 42 percent during the same period (Pacific States Marine Fisheries Commission 2009). The recent closures

¹⁴ PacFIN data are available from 1981 through 2009; however, available information is aggregated to the county level only. Port level data are provided by CDFG but only data for 2000-2008 were available for this study.

¹⁵ PacFIN is based on fish ticket and vessel registration data provided by the state fishery agencies of Washington, Oregon, and California. See <http://www.psmfc.org/PacFIN/data.html>.

¹⁶ The U.S. Coast Guard issues all commercial vessels a six-digit identification number. PacFIN uses those vessel identification numbers (VIDs) to track the number of resident and nonresident vessels offloading seafood in a particular region. The VIDs are obtained from fish ticket data recorded by seafood dealers and processors, and, in some cases, fishermen.

of the West Coast salmon fishery significantly diminished the number of commercial fishermen active along the North Coast and elsewhere in California.

Statewide landings and revenues have declined in conjunction with reduction in the size of the California fleet. Landings at California ports dropped from 796 million pounds in 1981 to 370 million pounds in 2009, a decline of 54 percent. Ex-vessel revenue fell by 49 percent during the same period. North Coast landings declined by 51 percent during the period 1981 through 2009, but ex-vessel revenue increased by 14 percent (Pacific States Marine Fisheries Commission 2010).

Small Commercial Vessels Registered to Residents. PacFIN uses vessel identification numbers (VIDs) to track the number of vessels active in a specific county or region. The VIDs, obtained from fish ticket data recorded by seafood dealers and processors, include boats owned by residents and non-residents. In contrast, the California Department of Motor Vehicles (DMV) vessel registration database includes only those vessels registered to California residents. Significantly, the DMV database includes commercial and recreational vessels under 30 feet in length only.¹⁷ As such, the DMV database captures trends in the number of small commercial vessels owned by residents of California, while the PacFIN database captures trends in commercial fishing vessels of all sizes as utilized by all commercial fishermen operating in California, including out-of-state residents.

DMV vessel registration data indicate a decline in participation in the North Coast small-boat commercial fishing fleet between 1981 and 2009.¹⁸ In 1981, 468 small commercial fishing vessels were active in the region; by 2009, that number had dropped by 49 percent to 237 vessels (California Department of Motor Vehicles 2009). Peak participation occurred in the early 1990s with 589 vessels (Figure 3-1). The greatest contraction in the number of North Coast commercial fishing vessels occurred in Humboldt County and Del Norte County, with declines of 58 percent and 57 percent, respectively. In Mendocino County, the number of registered commercial fishing vessels decreased by 20 percent. During the same period, the number of North Coast DMV-registered vessels increased from 6,030 vessels to 14,129 vessels (Figure 3-2).

Recent Challenges, North Coast Commercial Fisheries. Both PacFIN and DMV data reveal a decline in the overall size of the North Coast commercial fishing fleet. Pomeroy and Dalton (2003) assert that the decline between 1981 and 1985 was in part the result of the implementation of a limited entry program for the commercial salmon fishery in 1982, and the effects of the 1982-1983 El Niño event, which affected abundance and also generated weather and seas that limited access to the fishing grounds. Prohibition of commercial salmon trolling in the Klamath Management Zone (KMZ)¹⁹ beginning in 1985 reportedly also contributed to that decline

¹⁷ Sail-powered vessels more than eight feet and every motor-driven vessel that is not documented by the U.S. Coast Guard must be registered with the DMV. Commercial vessels of five net tons or more, or 30 feet or more in length must be documented by the Coast Guard but are not required to be registered with the DMV.

¹⁸ Data are not available for 1982 or 1984.

¹⁹ The KMZ is defined as the area from Humbug Mountain, Oregon, to Horse Mountain, California. Albion, Fort Bragg, and Shelter Cove are not located within the KMZ

(Pomeroy et al. 2010a). In subsequent years, measures for managing the Chinook salmon population in the KMZ included abbreviated commercial fishing seasons and quotas (Pierce 1998). Participation in the North Coast commercial salmon fishery was constrained by KMZ closures in 1985, 1992, 1993, 1994, and 1995, and statewide closures in 2008 and 2009.

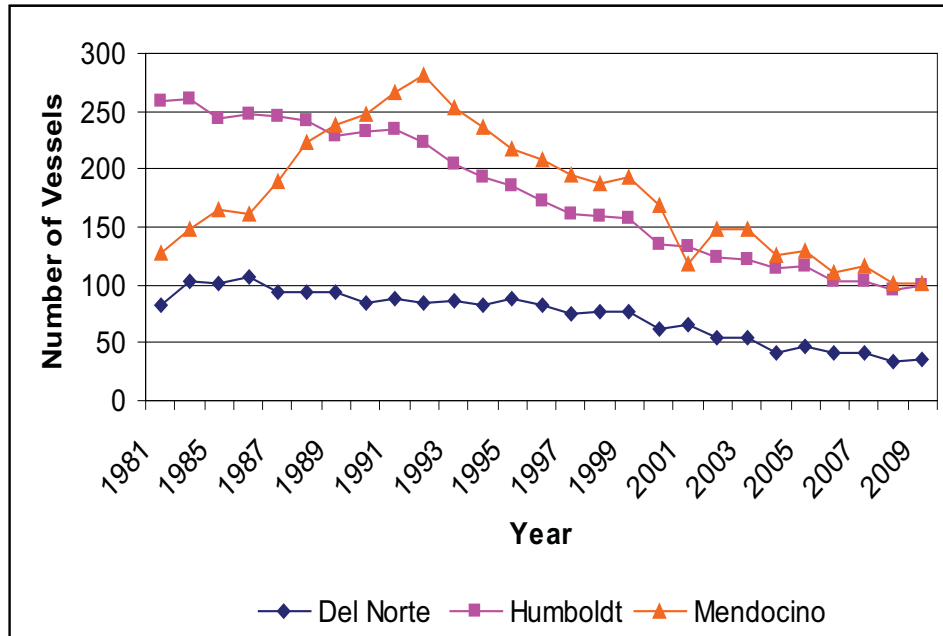


Figure 3-1 Resident-Owned Small Commercial Vessels by County
Source: California Department of Motor Vehicles 2009

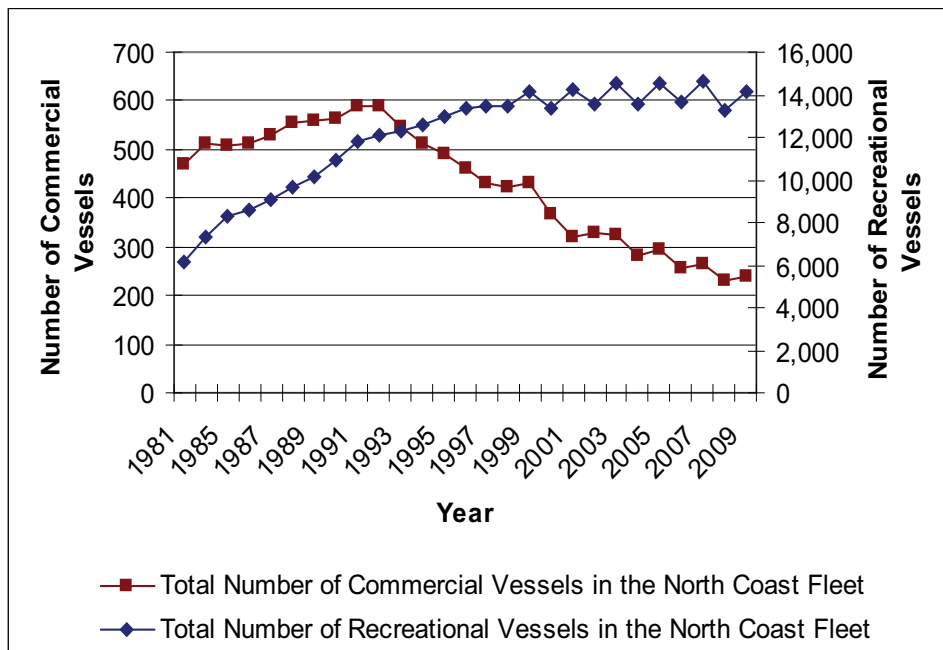


Figure 3-2 Resident-Owned Small Commercial and Recreational Vessels
Source: California Department of Motor Vehicles 2009

The introduction of limited entry permit programs for species other than salmon also reduced the number of vessels reporting landings in California and other Pacific Coast states. For instance, the federal groundfish limited entry program has resulted in fewer active commercial operations in California, though profits for captains with permits have reportedly increased (Radtke and Davis 2000). Further, the federal groundfish vessel/permit buyback program reduced the size of the groundfish trawl fleet in all three major harbors in the study region.

Other factors contributing to the overall decline in participation in California and North Coast commercial fisheries include: an increasing number of regulations; periodic scarcity of certain species; increased availability of farmed and imported products (especially salmon) in the marketplace; declining market prices for certain species; and mounting overhead costs, such as fuel, insurance, and Workman's Compensation (Pomeroy and Dalton 2003).

Most recently, establishment of 29 MPAs along the Central Coast of California has affected the nature and extent of participation in that region. In some areas, the MPAs have led to increased travel time and associated increases in fuel expenses and, in some cases, an overall increase in operating costs (Impact Assessment, Inc. 2010). Key persons report that similar effects have begun to result following establishment of 21 MPAs in the North Central Coastal region.

North Coast California Study Region: Landings from 1981 to 2009. The most economically important commercial species in the North Coast study region include: Dungeness crab, Chinook salmon, red sea urchin, ocean (pink) shrimp, Pacific whiting, and groundfish – including sablefish, rockfish, Dover sole, and petrale sole.

Table 3-1 Ex-Vessel Value of the Top Five Species Landed at North Coast Harbors: 2000-2008

Species	Total Revenue (\$)	Total Landings in Pounds	Average Annual Revenue (\$)	Average Annual Landings (lbs)
Dungeness Crab	146,196,931	86,289,909	16,244,103	9,587,767
Chinook Salmon	30,664,289	8,187,006	3,407,143	909,667
Sablefish	24,895,246	18,967,571	2,766,138	2,107,507
Dover Sole	11,392,108	31,711,029	1,265,789	3,523,447
Red Sea Urchin	10,155,168	14,878,171	1,128,352	1,653,130
Total North Coast Landings	285,125,949	329,077,307	31,680,661	36,564,145

Source: CDFG 2009a

Of the North Coast study counties, Del Norte County landings have been most extensive. Between 1981 and 2009, an average of 21 million pounds of seafood was offloaded in Del Norte County, with an annual average ex-vessel value of \$12.7 million.²⁰ Annual landings at the ports of Humboldt County averaged 20.9 million pounds, with an average ex-vessel value of \$11.6 million. Annual landings at Mendocino County averaged 14.3 million pounds and were valued at \$9.3 million (Table 3-3).

As regards recent trends, 384 vessel operators delivered 35 million pounds of seafood to North Coast ports of landing in 2008. Estimated total ex-vessel value of the catch was \$27 million (Pacific States Marine Fisheries Commission 2009).

²⁰ Ex-vessel values provided in this report have not been adjusted for inflation.

Table 3-2 Average Total Landings, Value (million USD), and Landings Data by County: 1981-2009

County	Landings (million lbs)	Revenue (million \$)	Fish Tickets	Vessel IDs	Processors ²¹
Del Norte	21.0	12.7	6,671	352	35.0
Humboldt	20.9	11.6	7,442	361	46.7
Mendocino	14.3	9.3	9,761	493	51.0
North Coast Regional Total	56.2	33.6	23,874	1,206	132.7

Source: PacFIN 2010

Seafood Processors, Wholesalers, Receivers, and Dealers. By law, processors, wholesalers, receivers, and dealers must complete a landing receipt (fish ticket) and submit these to CDFG on a semi-monthly basis. If the fisherman sells his catch directly to the consumer, he is defined as a “retail fisherman” and must also complete the landing receipt or fish ticket (CDFG 2003). Each buyer or retailer is issued a processor identifier number (PID). Thus, the data summarized here include both well-established processing and distribution operations and licensed individuals who regularly or occasionally sell to seafood buyers or buy seafood from commercial fishermen (Table 3-4).

Table 3-3 Types of Seafood Processors

Business Type	Description
Fish Processor	Any person who processes fish for profit and who sells to other than the ultimate consumer
Fish Wholesaler	Any person who, for the purpose of resale to persons other than the ultimate consumer, receives, purchases, or obtains fish from another person, who is required to be licensed as a fish processor, fish receiver, or fish wholesaler
Fish Receiver	Any person who purchases or receives fish for commercial purposes from a commercial fisherman not listed as a fish receiver
Fisherman Retail	A commercial fisherman who sells all or a portion of his/her catch to the ultimate consumer

Source: CFGC 1998

Based on PacFIN data, the number of processors involved in North Coast fisheries has varied extensively since 1981, ranging from a high of 172 in 1994 to a low of 90 in 1985.

Approximately 110 processors purchased or sold seafood in 2009 (Figure 3-3). For this discussion, it is critical to note that direct sales of fish made by individuals/commercial fishermen to seafood restaurants, seafood markets, and other retail establishments account for approximately 75 percent of PacFIN identified processors. As Pomeroy et al. (2010a, 2010b, 2009a, 2009b) report, there were seven active processing and distributing plants/operations and approximately 20 active buyers in the North Coast study region in 2010.

²¹ Includes licensed processors, wholesalers, receivers, dealers, and retail fishermen.

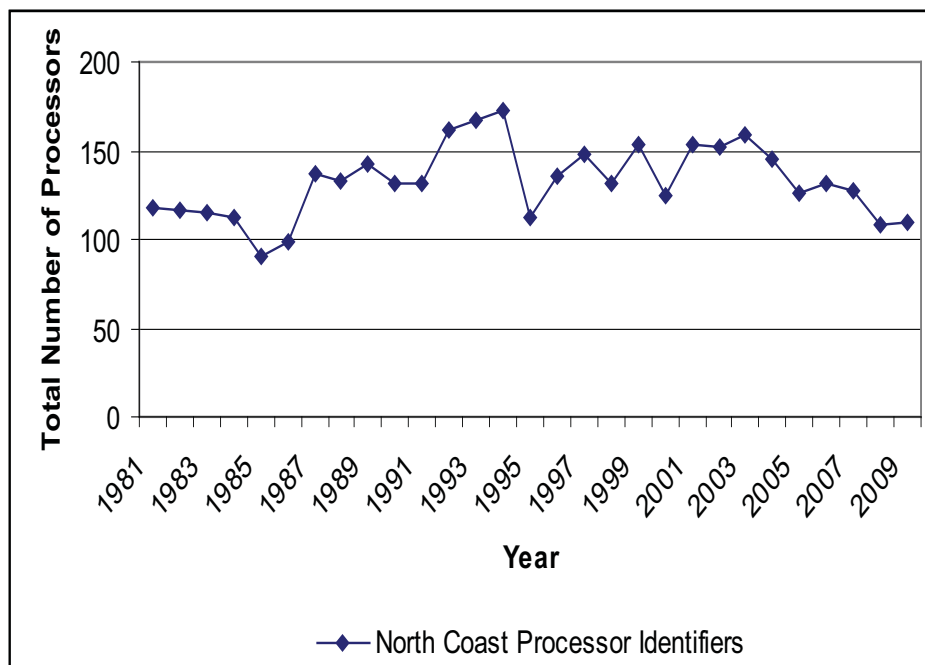


Figure 3-3 Number of Processors, North Coast: 1981-2009
Source: PacFIN 2010

Fishing Communities: Vulnerability, Dependence, and Resilience. Fishing communities are defined in part by the degree to which residents are engaged in or dependent on marine fisheries for economic, social, and cultural purposes. The Pacific Fisheries Management Council (PFMC) defines dependence as the degree to which a community relies on the sustained harvest of a single species or very few species, where the community in question is defined to include fishermen, buyers, processors, various industry support sectors, and the harbors that sustain and are sustained by the commercial and recreational fishing industries (PFMC 2009: 168-169).

A federal socioeconomic study on the rationalization of the Pacific Coast groundfish fishery (PFMC & NMFS 2006)²² developed criteria for assessing the degree to which West Coast fishing communities were engaged in and/or dependent on commercial fishing activities, and the capacity of those communities to adapt to potentially constraining regulatory changes. Communities deemed highly dependent on commercial fishing but lacking “resilience,” i.e., the social or economic capacity to adapt to change, were classified as “vulnerable” or “highly vulnerable.” Indicators of limited resilience included a high degree of community isolation and rurality, limited industry diversification, and high unemployment and poverty rates. According to the authors, “the purpose of identifying ‘communities of concern’ or ‘areas of vulnerability’ is to alert decision-makers to regions that may require particular focus and/or mitigation efforts” (PFMC & NMFS 2006b: A-79). It is notable that Del Norte County, and the cities of Crescent City, Fort Bragg, and Eureka were identified as “vulnerable” due to low levels of resilience and

²²Pacific Fishery Management Council (PFMC) and National Marine Fisheries Service (NMFS). 2006. Proposed Acceptable Biological Catch and Optimum Yield Specifications and Management Measures for the 2007-2008 Pacific Coast Groundfish Fishery, and Amendment 16-4: Rebuilding Plans for Seven Depleted Pacific Coast Groundfish Species; Final Environmental Impact Statement Including Regulatory Impact Review and Initial Regulatory Flexibility Analysis. Pacific Fishery Management Council, Portland, Oregon. October 2006.

high levels of dependence on commercial fishing. The counties of Humboldt and Mendocino were classified as “most vulnerable” (PFMC & NMFS 2006: A-107-110).

As discussed in Chapter Two of this report, residents of the North Coast region have long been dependent on natural resources; that is, timber, fish, and minerals. However, various factors have increasingly challenged the viability of industries involving extraction of those resources, and alternative industries, such as tourism, are limited in part by the geographic isolation of the region. Thus, unemployment rates in Humboldt, Del Norte, and Mendocino counties are chronically high, and significant near-term improvement appears unlikely. While regional planners seek new opportunities and economic development is a priority, many residents remain dependent on some aspect of commercial, recreational, or subsistence fishing activities and are struggling to adapt to changing economic, environmental, and regulatory conditions.

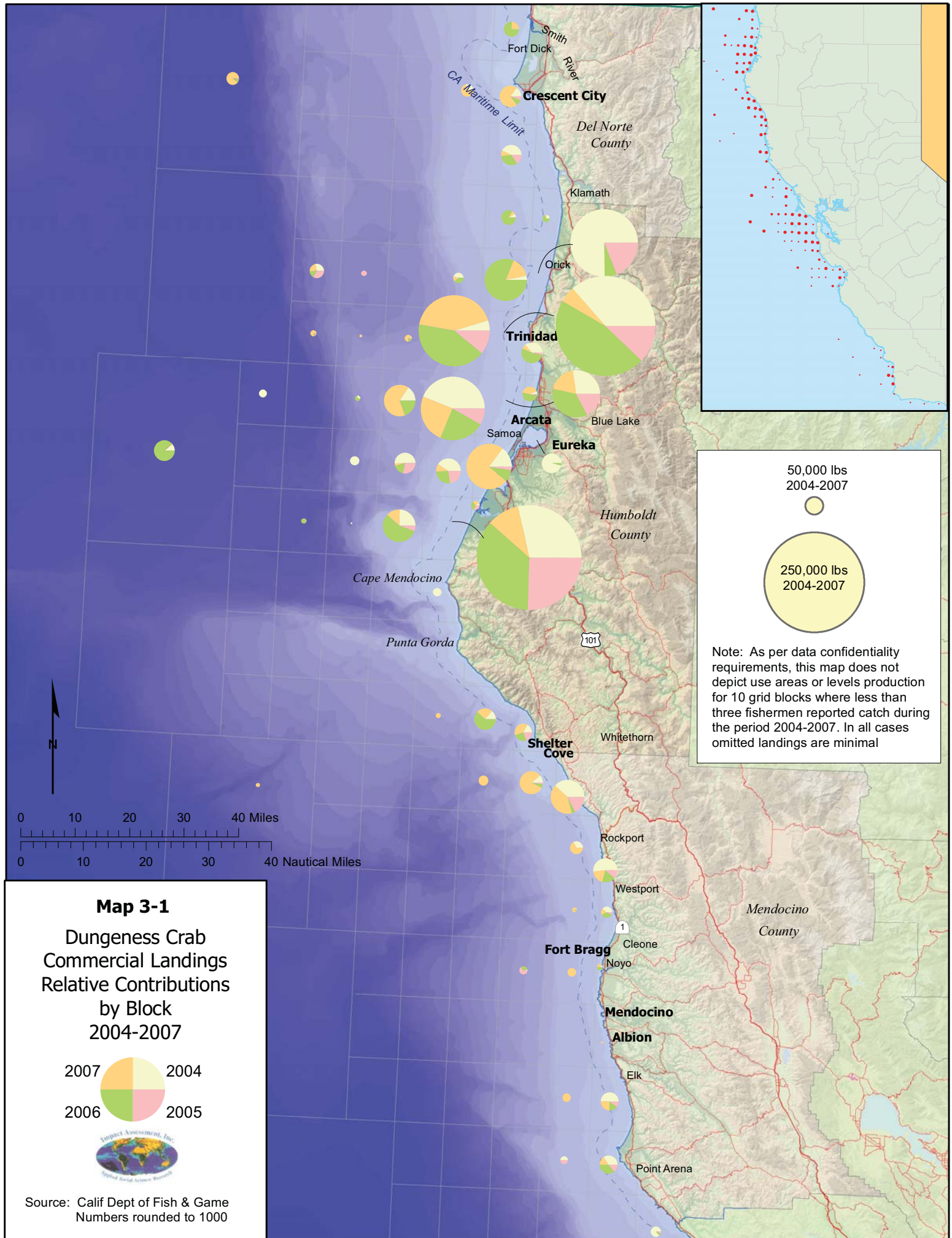
3.2 Overview of Select North Coast Fisheries

Dungeness Crab (*Cancer magister*). The Dungeness crab pot fishery is a vessel-based restricted access fishery. Soft and sandy bottom habitats are essential for Dungeness and 70 percent of the fishery is conducted in state waters (Driscoll 2009). The fishery is highly cyclical, with periods of high abundance tending to occur every eight to eleven years along the West Coast.

Harvest is restricted based on season and on size and sex of crabs. Only male crabs larger than 6.25 inches may be taken between mid-November or the beginning of December until the end of June or mid-July, depending on region. California officials approved a statewide limited entry program for Dungeness in 1992, implemented in 1995. The program capped the statewide number of resident commercial crab permits at 600: the latest figures report approximately 440 active and 160 latent permits (California Dungeness Crab Task Force 2010).

The California Dungeness crab sport fishery is managed by the Fish and Game Commission. Management measures include daily bag limits and restrictions by size and seasons. Regulations vary by region and by mode of fishing (California Dungeness Crab Task Force 2010).

The Dungeness crab fishery is the most profitable fishery in the North Coast region. Between 2000 and 2008, Dungeness crab landings accounted for 51 percent of all seafood sales in the region. Fishermen delivered 49 million pounds of Dungeness to Crescent City Harbor, 23 million pounds to Eureka, nine million pounds to Trinidad, and five million pounds to Noyo during the period (CDFG 2009a). Map 3-1 depicts ocean areas where Dungeness crab reportedly was harvested during the period 2004 to 2007. It should be noted that while a large percentage of crab was landed by the Crescent City fleet, relatively little crabbing activity occurred in the area during the years depicted.



Map 3-1

Dungeness Crab
Commercial Landings
Relative Contributions
by Block
2004-2007

2007 2004
2006 2005



Source: Calif Dept of Fish & Game
Numbers rounded to 1000

50,000 lbs
2004-2007

250,000 lbs
2004-2007

Note: As per data confidentiality requirements, this map does not depict use areas or levels production for 10 grid blocks where less than three fishermen reported catch during the period 2004-2007. In all cases omitted landings are minimal

The North Coast Dungeness crab season begins December 1 and continues into July. Captains with large vessels tend to be highly mobile; they will work crab grounds throughout the study region and often travel south to participate in District 10 early season opener. A few large-boat captains also hold Oregon and Washington crab permits; likewise, vessel operators from Alaska, Washington, and Oregon fish in California waters. The fishery is characterized by particularly extensive effort during the first part of the season, as needed to meet demand for crab over the winter holiday. During some years, 75 to 80 percent of the annual catch is landed in the first month of the season (Radtke and Davis 2000; Starr et al. 2002).

Historically, many crab fishermen have supplemented their income by focusing on salmon during times of limited abundance of crab. Due to precipitous declines in salmon abundance and restrictions implemented to manage those declines, however, this strategy is not currently viable. Dungeness crab is landed extensively in Crescent City, Trinidad, Noyo, and Eureka. The greatest volume is consistently landed in Crescent City (Figure 3-4).

Table 3-4 Dungeness Crab Landings (in pounds) at Major North Coast Ports: 2000-2008

Year	Crescent City	Trinidad	Eureka Area*	Shelter Cove	Noyo/Fort Bragg	Albion
2000	3,349,197	476,963	923,706	8,872	398,702	NA
2001	1,143,519	216,316	348,133	NA	300,672	NA
2002	1,639,843	311,754	873,614	NA	180,606	NA
2003	9,468,243	2,763,985	5,505,905	NA	608,652	NA
2004	11,280,936	1,704,624	5,126,655	6,098	866,008	0
2005	2,844,190	618,249	1,686,588	7,996	273,431	0
2006	12,871,483	1,890,690	4,524,210	16,784	853,498	0
2007	4,346,816	609,311	2,524,820	19,108	635,958	0
2008	2,466,733	559,722	1,708,091	31,549	671,206	0
Avg. Pounds	5,490,107	1,016,846	2,580,191	10,609	532,081	590
Avg. Value	\$9,331,586	\$1,577,437	\$4,513,575	\$25,671	\$1,024,607	\$2,180

* Includes the ports of Eureka, Fields Landing, and King Salmon.

Source: CDFG 2009a; NA = Below reporting threshold.

Key discussants in the study region report that consolidation of the region's seafood industry over the last decade has led to less competition among buyers and processors, and ultimately to diminished profit in the harvest sector. Some small boat crabbers report that it can be difficult to offload their catch during peak season when crab from large non-resident crab vessels reportedly floods the market, overwhelming local processing and distribution capacity. Some such fishermen have responded by selling live crabs to local restaurants and retail establishments.

Hankin et al. (2005) report that competition for limited crab resources has increased over the past decade partly in association with reduction in the size of the California groundfish fleet and recent closure of the salmon fishery. Key fishermen and public officials contacted during the course of the present study support this explanation and some have expressed concern that numerous crabbers in Northern California and the Pacific Northwest have invested their salmon disaster relief monies in crab gear, thereby increasing pressure on the resource and competition in this perennially important North Coast fishery.

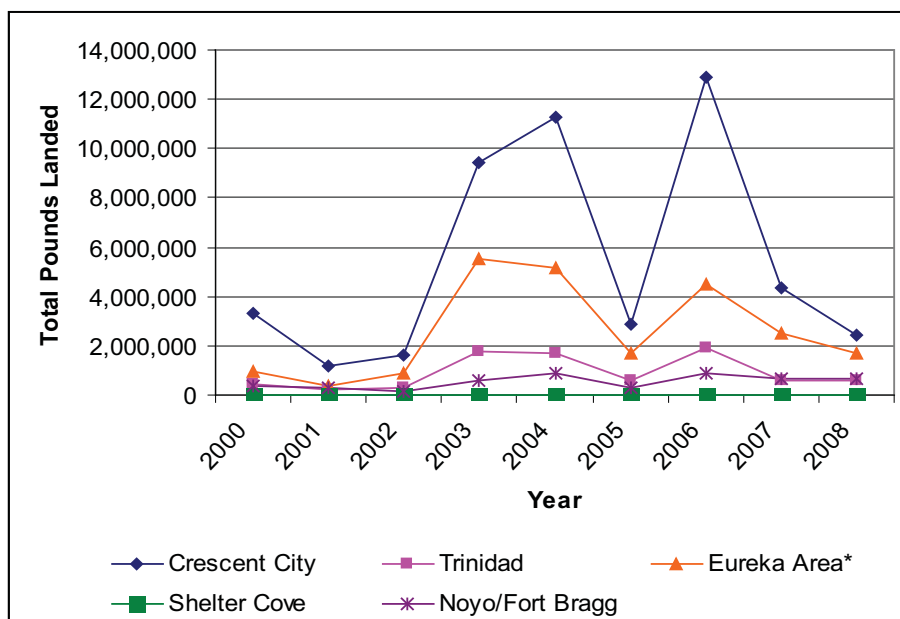


Figure 3-4 Dungeness Landings at Principal North Coast Ports: 2000-2008

* Includes the ports of Eureka, Fields Landing, and King Salmon. Source: CDFG 2009a

Seasonal availability and spikes in demand for crab often lead to periods of intense effort on the crab grounds of the North Coast. It is often the case that during such periods local small vessel operators compete with larger operations owned by both resident and non-resident captains. Competition for limited resources in a narrow window of time and within the confines of favorable habitat can be demanding on all crews and vessels. Vessel traffic and entanglement of gear are common challenges. “Corking” (tangling of lines) requires time and effort to amend, and pots are lost at times. Long-time crabbers often develop informal use rights to specific grounds and conflicts can occur when tenure is disregarded or disrespected. Based on interviews with key crabbers and observation of fishing operations in other regions (Impact Assessment Inc. 2010, 2009, and 2006), the frequency and gravity of conflicts can be expected to increase when regulatory or other factors lead to increased effort in grounds with limited favorable habitat as could result from implementation of marine protected areas.

Chinook Salmon (*Oncorhynchus tshawytscha*). Chinook or “king” salmon is the principal salmon species harvested in California; the coho or silver salmon fishery was closed in 1994. Fishery participants typically harvest salmon in the ocean using troll gear. While cycles of relative abundance and scarcity tend to vary by region and year, salmon has remained among the top five most productive commercial fisheries in the study region. However, the West Coast salmon fishery was closed in 2008 and 2009. A limited commercial salmon season has been allowed for 2010.²³ Map 3-2 depicts commercial salmon landings in the North Coast study region. Of note on the map is the absence of fishing activity around Crescent City. This relates

²³ Commercial fishing for all salmon, except coho, is permitted south of Horse Mountain to Point Arena July 1-4; July 8-11; July 15-29; and August 1-31 or until the Chinook quota of 9,375 has been reached. Minimum size limit is 27 inches total length; all salmon must be landed within the quota area and within 24 hours of closure (CDFG 2010).

in large part to a very small allocation of commercial salmon in the KMZ and more profitable salmon fishing elsewhere.

Table 3-5 Chinook Salmon Landings (in pounds) at Major North Coast Ports: 2000-2008

Year	Crescent City	Trinidad	Eureka Area*	Shelter Cove	Noyo/Fort Bragg	Albion
2000	NA	2,366	57,873	NA	371,299	2,271
2001	12,700	NA	86,452	5,549	367,297	1,368
2002	54,995	6,867	129,100	10,239	1,071,275	2,246
2003	38,525	1,367	42,643	107,627	3,351,571	2,937
2004	303,747	5,264	98,905	65,081	1,299,154	NA
2005	25,045	10,177	67,238	6,786	870,731	NA
2006	NA	0	NA	NA	269,454	NA
2007	34,383	3,246	81,543	4,041	345,627	0
2008	0	0	0	0	0	0
Avg. Pounds	52,586	3,259	62,795	22,410	882,934	1,069
Avg. Value	\$152,904	\$9,796	\$167,249	\$52,324	\$3,341,625	\$3,408

* Includes the ports of Eureka, Fields Landing, and King Salmon.

Source: CDFG 2009a; NA = Below reporting threshold.

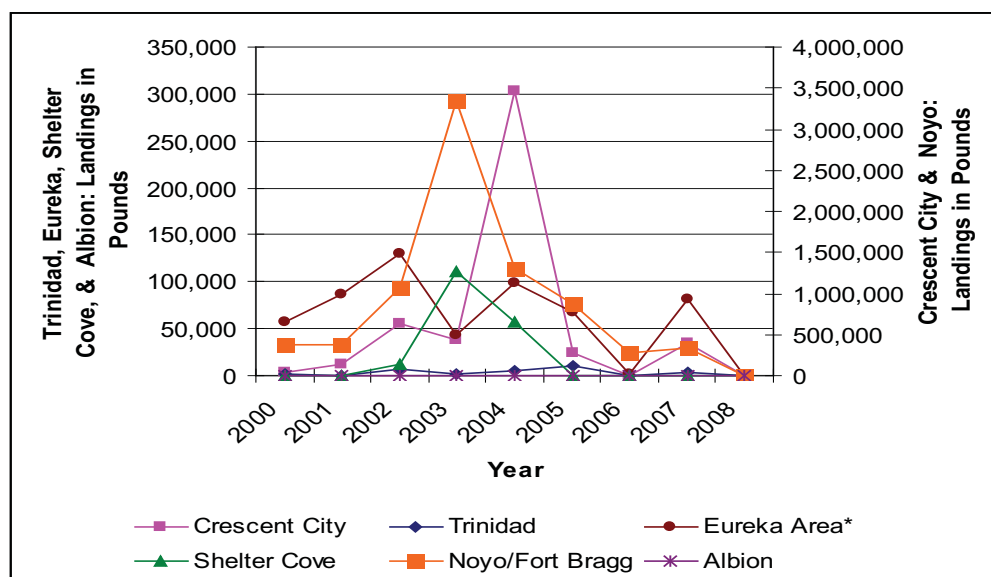
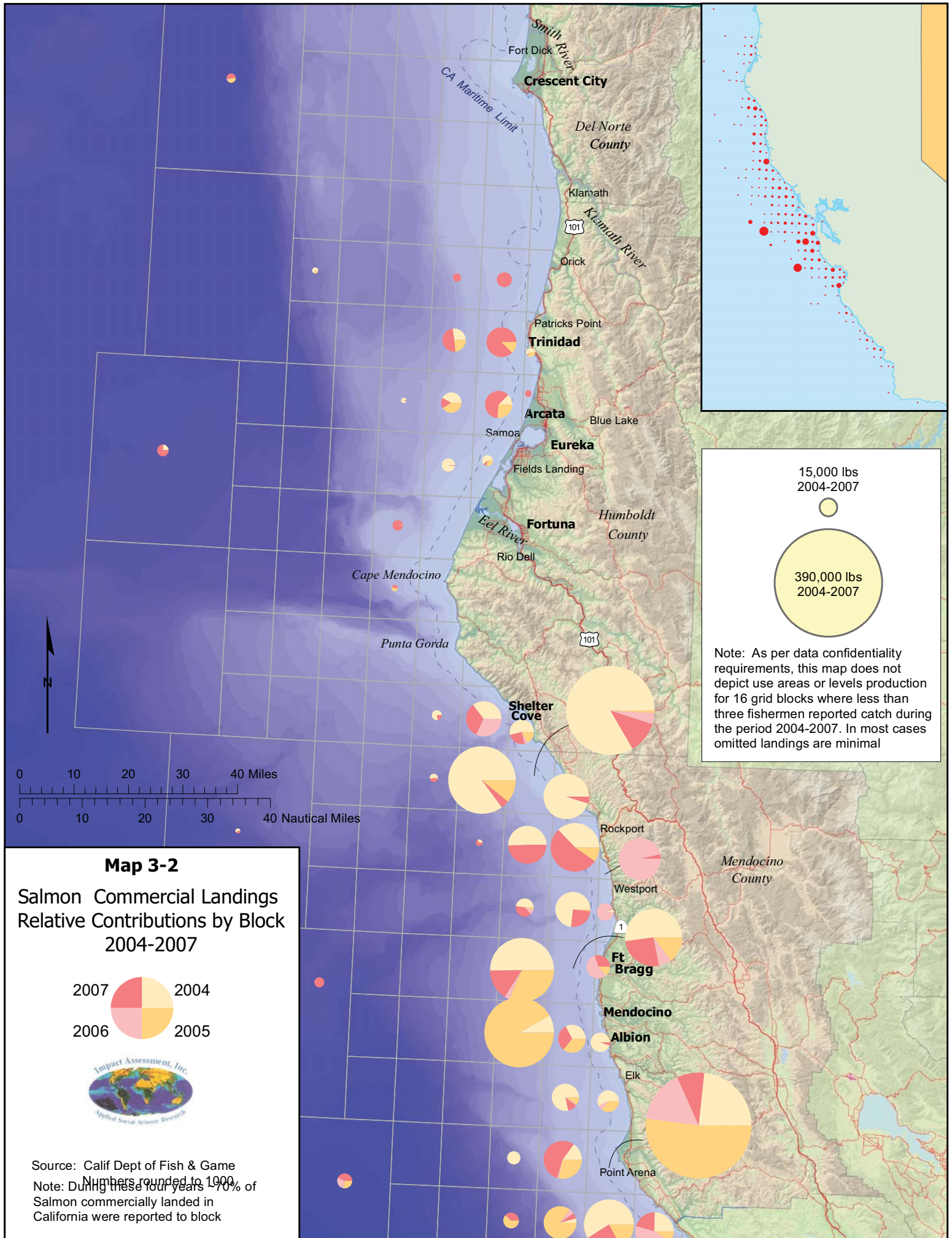


Figure 3-5 Chinook Salmon Landings at Major North Coast Study Region Ports: 2000-2008

* Includes the ports of Eureka, Fields Landing, and King Salmon. Source: CDFG 2009a

Several factors have affected the salmon fishery over the last decade or so—and particularly in the last few years. Importantly, the Sacramento River system supplies 90 percent of salmon caught in California, and nearly 60 percent of salmon is currently caught in waters north of San Francisco. The Klamath stock reportedly has been affected by disease, the diversion of water to inland farms, and hydroelectric dams (Guillen 2003). The fishery has also been challenged by the increased presence of farmed salmon in the marketplace (Knapp et al. 2007), and by new regulations (see Pomeroy et al. 2009a; 2010a). Key regulatory events include: the establishment of the Klamath Management Zone (KMZ) in 1979; the implementation of a limited entry program in 1982 ; reduction in the length of the KMZ salmon season in 1984 ; and full closures of the commercial fishery in 1985, 1992, 1993, 1994, 1995, 2008, and 2009.



The West Coast salmon fishery was declared to be in disaster status in 2008 and 2009. CDFG estimated 2,263 California jobs would be lost with overall losses reaching \$255 million for the 2008 closure, and 2,690 California jobs and \$279 million for the 2009 closure (Office of the Governor of California 2008, 2009).²⁴ In 2008, the Bush administration disbursed \$100 million to affected West Coast salmon fishermen: \$63 million in California, \$25 million in Oregon, and \$12 million in Washington (Barnard 2008). In 2009, the Obama administration approved \$53.1 million to assist California and Oregon communities affected by the closure. Approximately \$46.4 million was designated for fishery participants in California and \$6.7 million for participants in Oregon (Bacher 2009). Public officials report that impacts are particularly extensive along the North Coast, where a high number of commercial fishermen lack alternative opportunities for adapting to changes in the industry (PFMC and NMFS 2008).

The 2010 commercial and recreational salmon seasons are being regulated in part by the number of days open to fishing, size limits, and quotas. The commercial season is completely closed from the Oregon-California border south to Horse Mountain (CDFG 2010b). No disaster funds have been appropriated for 2010.

Nearshore Rockfish (*Sebastes spp.*). Rockfish tend to feed along the seafloor. Rockfish species may be categorized based on preferred habitats, which include shallow nearshore and deeper nearshore habitats, shelf habitats, and slope habitats. The commercial and recreational rockfish fisheries of California are particularly important in economic and dietary terms, and much fishing activity along the North Coast involves pursuit of these species.

Over the years, nearshore rockfish have provided North Coast commercial fishermen with a consistent, accessible resource. In the 1980s and 1990s, the hook-and-line and live rockfish fisheries provided displaced trawl, gill net and, most recently, salmon troll fishermen with alternative fisheries. Rockfish is also commonly pursued by recreational fishermen. Nearshore rockfish are harvested using a variety of gear, including longlines, stick gear, traps, and hook-and-line gear.

Management of rockfish is complicated for many reasons, not the least of which is the wide range of species and habitats involved. Some rockfish are completely under federal jurisdiction, others are state-managed, and yet others are managed by both state and federal agencies. Both the federal Groundfish Fishery Management Plan (GFMP) and the state Nearshore Fishery Management Plan (NFMP) provide regulations regarding harvest of rockfish. The GFMP is administered through the Pacific Fisheries Management Council. The Nearshore FMP addresses 19 species of nearshore finfish, 16 of which are also federally managed.²⁵ California issues two

²⁴ Estimated losses associated with the closures vary between state and federal agencies and with regard to the impact categories considered.

²⁵ Black rockfish (*Sebastes melanops*), black-and-yellow rockfish (*S. chrysomelas*), blue rockfish (*S. mystinus*), brown rockfish (*S. auriculatus*), calico rockfish (*S. dallii*), china rockfish (*S. nebulosus*), copper rockfish (*S. caurinus*), gopher rockfish (*S. carnatus*), grass rockfish (*S. rastrelliger*), kelp rockfish (*S. atrovirens*), olive rockfish (*S. serranoides*), quillback rockfish (*S. maliger*), treefish rockfish (*S. serripes*), cabezon (*Scorpaenichthys marmoratus*), kelp greenling (*Hexagrammos decagrammus*), rock greenling (*H. lagocephalus*), California scorpionfish (*Scorpaena guttata*), California sheephead (*Semicossyphus pulcher*), and monkeyface prickleback (*Cebidichthys violaceus*).

types of nearshore fishing permits: a shallow nearshore permit and a deeper nearshore permit. The shallow nearshore permit is required for cabezon, greenlings, California scorpionfish, California sheephead, and the following rockfish: black-and-yellow, china, gopher, grass, and kelp. The deeper nearshore permit is required for black, blue, brown, calico, copper, olive, and quillback rockfish.

California established a limited entry program for the nearshore rockfish fishery in 1998. Control dates were set between 1994 and 1999. Size and catch limits for nearshore rockfishes were also established. Commercial fishermen who now wish to fish in nearshore areas must buy either a transferable Nearshore Fishing Permit or a non-transferable Deeper Nearshore Fishing Permit (Myers et al. 2007). A total of 172 nearshore and 220 deeper nearshore permits were issued statewide in 2009 (CDFG 2010c), including 22 North Coast nearshore permits. Regulations now require that a permit be retired before a new participant can enter the fishery.

Although rockfish landings have been declining since 1990, the fishery remains particularly important for some North Coast communities, such as Shelter Cove, Trinidad, and Albion. Total combined commercial landings for all species of rockfish using all gear types are provided in Table 3-6 and Figure 3-6 below.

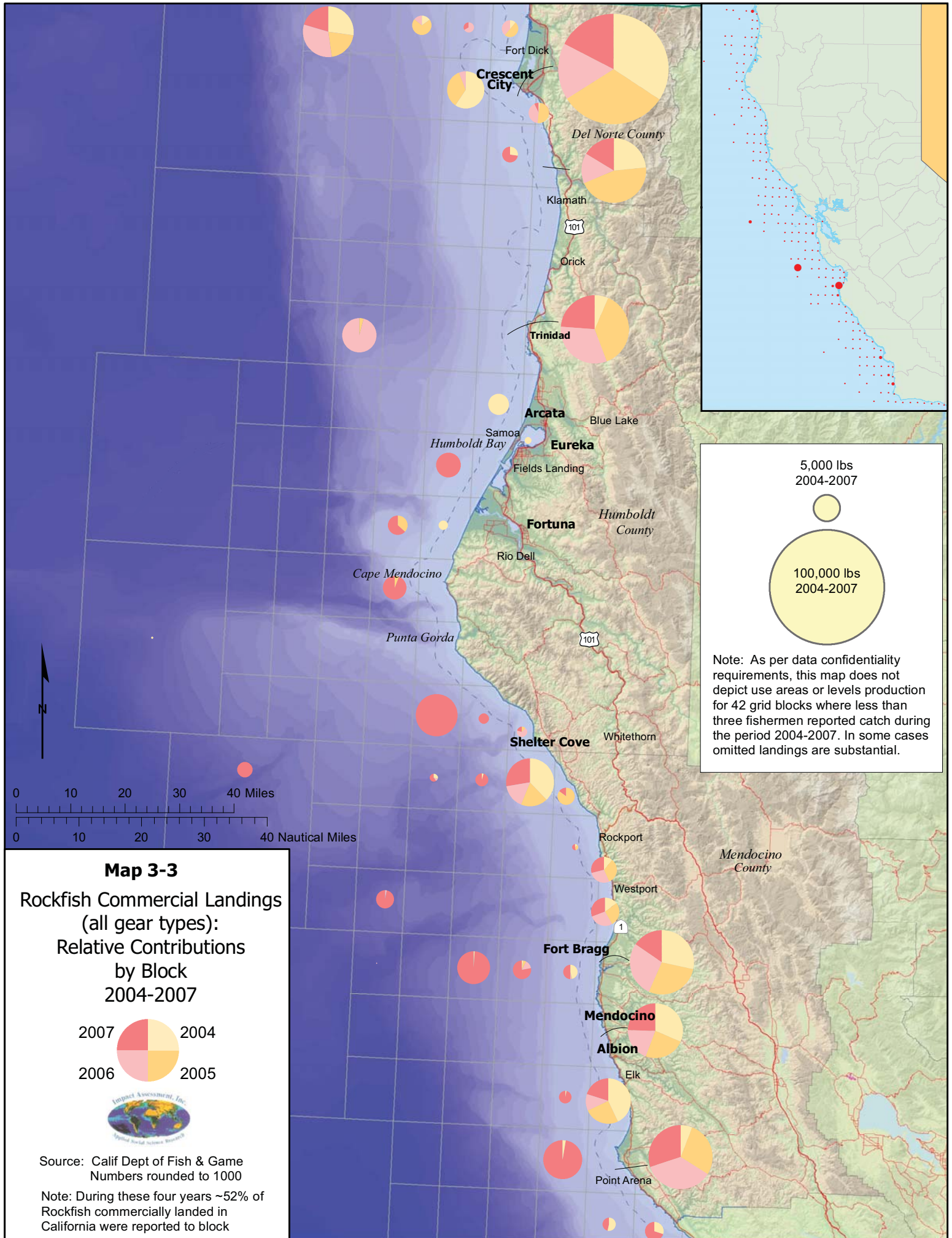
Table 3-6 Rockfish Landings (in pounds) at Major North Coast Ports: 2000-2008

Year	Crescent City	Trinidad	Eureka Area*	Shelter Cove	Noyo/Fort Bragg	Albion
2000	568,317	3,310	949,691	12,137	892,766	5,809
2001	458,919	12,000	633,961	8,567	660,889	918
2002	197,449	21,014	278,535	4,756	435,089	701
2003	142,485	7,725	72,820	4,031	78,653	2,778
2004	186,126	7,487	174,790	6,121	464,056	5,903
2005	200,217	17,348	109,643	2,568	254,778	5,263
2006	177,964	15,251	82,605	3,368	161,173	3,296
2007	236,555	15,560	108,682	5,233	277,881	4,553
2008	305,899	14,235	70,304	6,758	305,620	2,943
Avg. Pounds	274,881	12,659	275,679	5,949	392,323	3,574
Avg. Value	\$374,576	\$18,861	\$150,142	\$10,509	\$250,584	\$12,330

* Includes the ports of Eureka, Fields Landing, and King Salmon. Source: CDFG 2009a; NA = Below reporting threshold.

Rockfish Conservation Areas (RCAs) were adopted in 2001 and implemented in 2002. RCAs are intended to minimize incidental catch of rockfish species declared as overfished by NOAA Fisheries by limiting use of certain gear or closure of particular areas. The RCA network includes Yelloweye Rockfish Conservation Areas, Cowcod Conservation Areas, the Cordell Banks Closed Area, the Farallon Islands Closed Areas, and Essential Fish Habitat Conservation Areas (NOAA 2007). The location and boundaries of a given RCA are modified based on updated information regarding the status of the species being protected.

From a management perspective, the RCAs were an alternative to closing down a given fishery entirely and a way to allow some fishing to continue while depleted stocks rejuvenated. However, the RCAs also led numerous commercial fishermen to work in nearshore areas, with the resulting concentration of effort in shallow waters ultimately addressed in the NFMP. Map 3-3 below depicts the ubiquitous nature of rockfish fishing along the North Coast region.



Map 3-3

**Rockfish Commercial Landings
(all gear types):
Relative Contributions
by Block
2004-2007**

2007 2004
2006 2005



Source: Calif Dept of Fish & Game
Numbers rounded to 1000

Note: During these four years ~52% of
Rockfish commercially landed in
California were reported to block

5,000 lbs
2004-2007

100,000 lbs
2004-2007

Note: As per data confidentiality requirements, this map does not depict use areas or levels production for 42 grid blocks where less than three fishermen reported catch during the period 2004-2007. In some cases omitted landings are substantial.

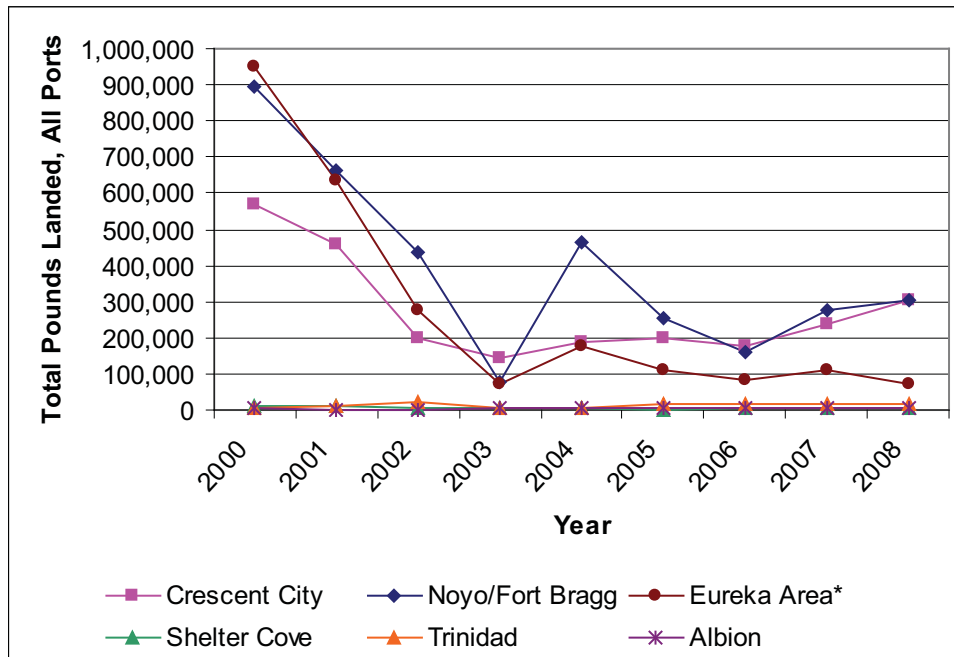


Figure 3-6 Rockfish Landings at Major North Coast Study Region Ports: 2000-2008
Source: CDFG 2009a

Red Sea Urchin (*Strongylocentrotus franciscanus*). Urchins are herbivorous invertebrates that feed extensively in kelp forests. Harvest of urchins is truly an ancient practice along the coast of California. Lawrence (2007) cites Erlandson et al. (2004) who report evidence that urchins were being consumed on the Channel Islands some 9,800 years before present. Urchins were used throughout the centuries by tribal groups and later by settlers of European ancestry.

A commercial urchin fishery developed around Fort Bragg in the 1970s. The species became increasingly important in Northern California in the 1980s, when urchin populations in Southern California were in decline. Urchins are harvested for roe, and a large percentage of the product is shipped to markets in Japan (CDFG 2004). North Coast urchin landings peaked in 1988 at 30.5 million pounds but leveled off to about four million pounds per year by the mid-1990s (CDFG 2004). During the period 2000 to 2008, annual landings averaged 1.7 million pounds along the North Coast, with an average ex-vessel value of \$1.1 million (CDFG 2009a).

Management measures for the red sea urchin fishery include: limiting gear to rakes and other hand appliances; minimum legal size limits; seasonal closures; and restricting the number of allowable fishing days (CDFG 2004). A moratorium on new permits was instituted in 1987, a restricted access program was established in 1989; and an effort-reduction scheme introduced in 1990 presently requires ten permits to be retired before a new participant can enter the fishery (CDFG 2004).

Noyo Harbor is central to the North Coast urchin fishery. The rocky reefs around Albion also support a robust fishery. Noyo area processors report that competition with foreign sources of urchin has limited the profitability of the North Coast fishery.

Table 3-7 Red Sea Urchin Landings (in pounds) at Major North Coast Ports: 2000-2008

Year	Noyo/Fort Bragg	Albion
2000	2,129,162	862,271
2001	2,194,204	643,486
2002	2,171,880	841,555
2003	830,620	277,279
2004	420,809	113,342
2005	648,277	171,192
2006	532,308	40,281
2007	871,870	215,136
2008	1,373,499	526,889
Average Pounds	1,241,403	410,159
Average Value \$	\$830,291	\$287,785

Source: CDFG 2009a

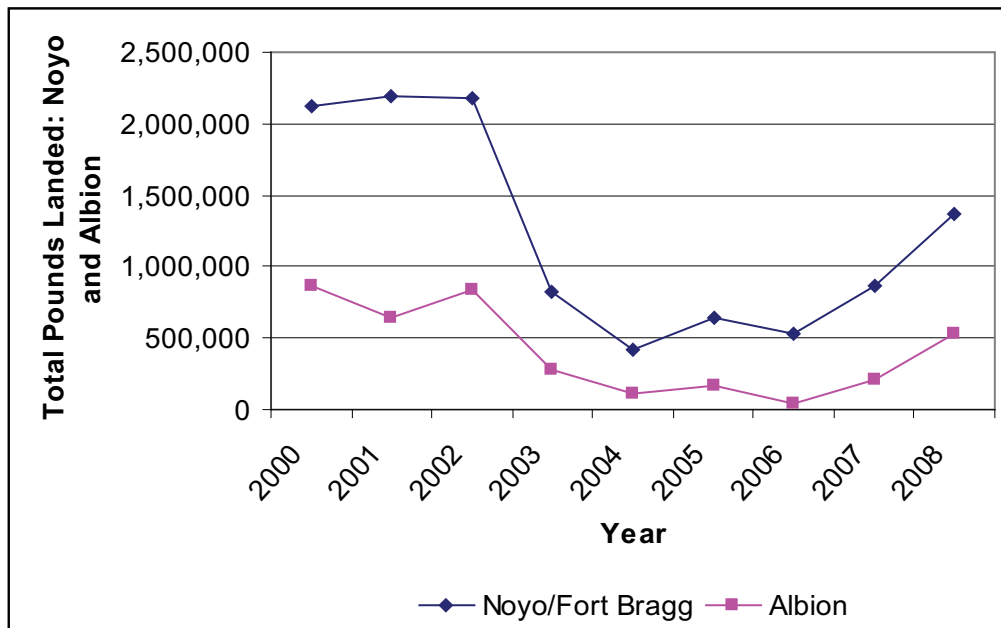


Figure 3-7 Urchin Landings at Major North Coast Study Region Ports: 2000-2008

Source: CDFG 2009a

North Coast Recreational Fisheries. Thousands of anglers fish along the shoreline and nearshore zone of the North Coast each year. Although some private boat owners fish recreationally in federal jurisdiction waters, the majority of angling occurs along the shoreline, around piers and jetties, and within state waters. Heavy North Pacific swell and rough local surface conditions in winter tend to limit activity primarily to the calmer months.

According to the *California Recreational Fisheries Survey Annual Review* (CDFG 2008a), anglers in Humboldt, Mendocino, and Del Norte County took an estimated 140,799 fishing trips in 2007.²⁶ This included some 60,000 beach and bank trips, 57,000 pier and jetty trips, 14,000

²⁶ CDFG has designated Mendocino County and the Shelter Cove section of Humboldt County as the “Wine District,” and Del Norte County and the northern part of Humboldt County as the “the Redwood District.”

boat trips, and 10,100 Commercial Passenger Fishing Vessel (CPFV or charter) trips. The authors report that recreational effort has generally declined in the region since 2004. Private property and steep terrain limit access to certain otherwise favorable fishing locations along the North Coast.

Table 3-8 Estimated Number of Angler Trips by District and Mode: 2007

District	Fishing Mode				Total
	Man-made Structures	Beach and Bank	CPFV	Private and Rental Boats	
South	1,144,114	611,388	201,947	215,826	2,173,275
Channel	197,230	155,321	34,817	24,643	412,011
Central	157,502	137,256	43,166	25,245	363,169
San Francisco	274,891	294,194	39,238	38,457	646,780
Wine	13,481	23,271	5,523	7,094	49,369
Redwood	43,393	36,522	4,626	6,889	91,430
Statewide	1,830,611	1,257,952	1,257,952	318,154	3,736,034

Source: CDFG 2008a

When considered in total, North Coast and Central Coast anglers most typically landed rockfishes and surfperch, with upwards of one million rockfish, and 370,000 surfperch estimated to have been landed in these regions during 2007.

Table 3-9 Types of Fish Commonly Caught by Recreational Anglers, Northern and Central California: 2007

Types of Fish	Estimated Number of Fish Harvested
Rockfish	1,013,197
Surfperch	369,775
Anchovies	230,891
Silversides (topsmelt, jacksmelt)	201,386
Tunas and Mackerels	98,531
Flatfish (halibut, sole, flounder, turbot, sanddab)	69,665
Smelts (surfsmelt)	62,276
Greenlings and Lingcod	58,735
Salmon	48,381
Croakers (i.e., white croaker, white seabass)	37,351

Source: CDFG 2008a

According to the California DMV (2009), the number of privately owned recreational vessels registered in the North Coast region increased by 130 percent between 1981 and 2009.²⁷ Registration increased by 147 percent in Humboldt County, by 117 percent in Mendocino County, and by 101 percent in Del Norte County (Figure 3-11). Boat-based anglers active in the North Coast region tend to pursue various rockfish, salmon, lingcod, flatfish, and tuna.

Consumptive diving is an important recreational and food collection activity in all three counties of the North Coast study region. Divers and dive shop owners report that diving often occurs along portions of Mendocino County where nearshore visibility is relatively high. Divers in the

²⁷ California law requires all vessels to be registered, with the exception of boats that are propelled manually, sailboats less than eight feet in length, ship lifeboats used solely for lifesaving, boats registered in another state, and sailboards (California Department of Boating and Waterways 2010).

North Coast region target abalone, lingcod, rock scallops, cabezon, kelp greenling, perch, urchin, crab, California halibut, and various rockfish. The use of scuba gear is permitted while pursuing all species, with the exception of abalone. Abalone of seven inches or greater may be taken while free-diving during the months of April, May, June, August, September, October, and November. A bag limit of three per day, 24 per year, applies. Divers may use spear guns to hunt finfish. Most finfish may be taken year-round, but size and bag limits apply, and ling cod may not be taken between December and March. Most diving occurs during periods when sea conditions are relatively calm.

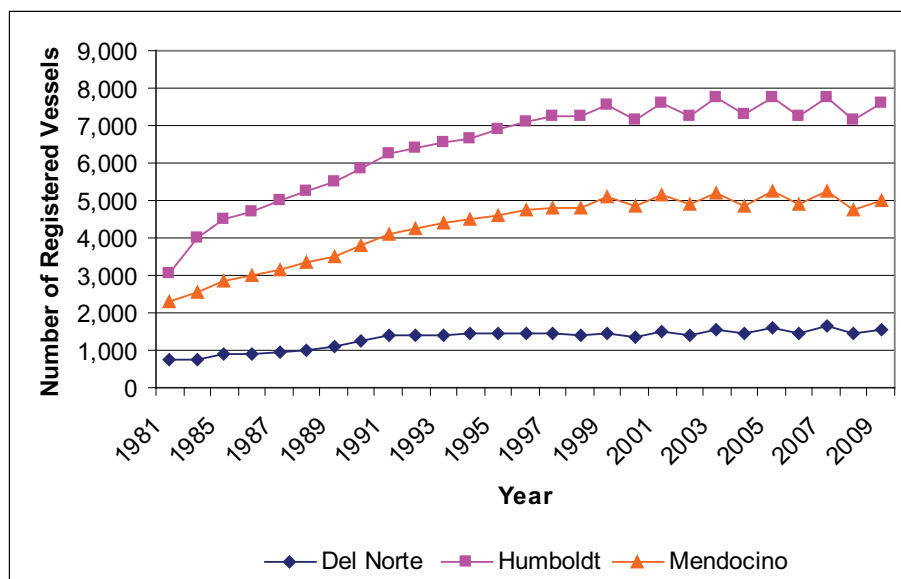


Figure 3-8 North Coast Recreational Vessel Registration: 1981-2009
Source: California Department of Motor Vehicles 2009

Charter captains have been operating in the North Coast region since the 1940s. Today, most charter boats are based at Trinidad and Noyo/Fort Bragg (Table 3-10). According to CDFG (2009c), the number of active North Coast charter operations has ranged between 14 and 19 since the year 2000 (CDFG 2009c), with 17 operations serving a total of 5,876 passengers and landing 44,529 pounds in 2008. North Coast charter operators typically pursue rockfish, lingcod, California halibut, and salmon. As noted in Figure 3-9, a sharp decline in CPFV landings occurred in association with closure of the recreational salmon fishery in 2008.

Table 3-10 Number of Charter Operations in Study Region Ports: 2010

Port	County	Number of Charter Operations
Trinidad	Humboldt	6
Eureka	Humboldt	3
Shelter Cove	Humboldt	1-3
Crescent City	Del Norte	1-2
Noyo/Fort Bragg	Mendocino	5+
Albion	Mendocino	0

Source: IAI 2010

North Coast charter captains generally operate between February and November. Peak demand occurs between April and October when the weather is most temperate, many people are on vacation, and multiple fishing seasons are open.

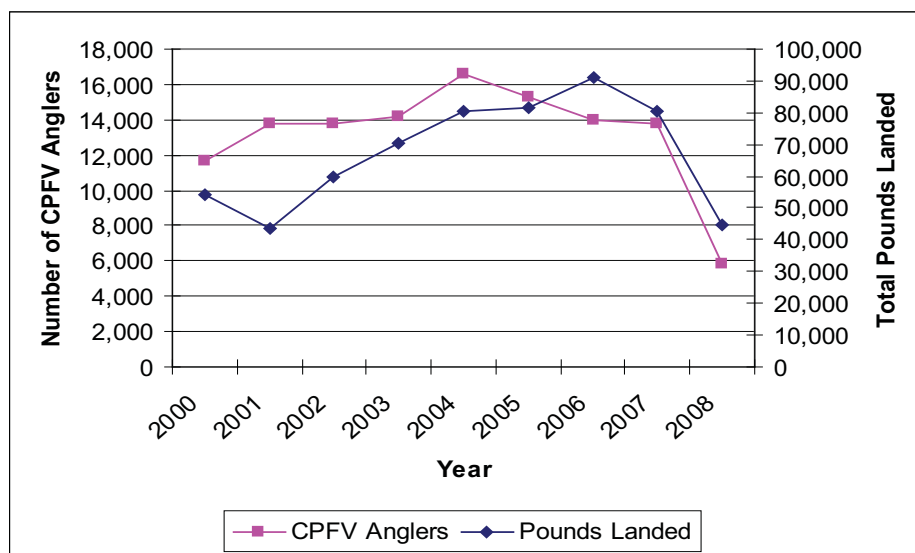


Figure 3-9 Number of CPFV Patron-Anglers and Pounds of Seafood Landed in the North Coast Region: 2000-2008

Source: California Department of Fish and Game 2009c

Many charter operators contacted during this study say that regulations such as depth restrictions, fewer fishing days, and bag limits have increasingly constrained their operations. Formerly allowed year-round, recreational rockfish fishing is now permitted only for three months south of 40°10' and for four months north of 40°10'.²⁸ One key participant in the North Coast charter fishery laments that the current rockfish season south of 40°10' ends during mid-August, when patrons are still seeking out recreational angling opportunities. Further, RCAs have recently been expanded shoreward in the region, from 30 to 20 fathoms in depth. The recent salmon closures have also strained charter businesses formerly providing salmon fishing opportunities.

Several charter skippers in Humboldt County have recently gone out of business.²⁹ One operator states that he would have had to double his rates to remain in the industry. Others have found ways to adapt to limited seasons and changing regulations. For instance, some skippers in the Noyo/Fort Bragg area have diversified by offering whale-watching trips. Others offer trips for “whatever is biting,” rather than pre-arranged trips focused on pursuit of a particular species. Some captains supplement their earnings by participating in the commercial crab fishery.

²⁸ The north-south line falls just north of Shelter Cove. Thus, while rockfish fishing is permitted for 90 days in the waters immediately adjacent to and south of Shelter Cove, anglers can fish the full 120-day season by traveling north to the Eureka, Trinidad, and Crescent City areas.

²⁹ From Humbug Mountain, Oregon to Horse Mountain, California, the 2010 recreational salmon season runs from May 29 to September 6. Recreational anglers are permitted two salmon per day (minimum size of 24 inches) of any species except coho. The KMZ is closed in August. From Horse Mountain to Point Arena, the season runs from April 3 to April 30, and from May 1 to September 6. Anglers are permitted two salmon per day (minimum size of 20 inches in April; minimum size of 24 inches between May 1 and September 6) of any species except coho.

3.3 Overview of Commercial and Recreational Fisheries by County and Port

This section provides additional descriptive detail regarding trends in North Coast fisheries for the period 1981 to 2009, with an emphasis on recent trends. The section is organized by county, with extensive discussion of commercial and recreational activity at the principal ports in each county. Data are aggregated to describe baseline trends for the region as a whole and to identify important sources of change in each county.

Humboldt County. Trinidad, Eureka, Fields Landing, and Shelter Cove are the principal ports of landing in Humboldt County. Fishermen will occasionally offload small amounts of crab or tuna at King Salmon. In 2008, Eureka was the fourth leading port in California in terms of landings (44th in the U.S.), and the third leading California port in terms of ex-vessel value (NMFS 2008). Some 13.3 million pounds of seafood were landed at Eureka that year, with a total ex-vessel value of \$9.3 million. Trinidad landings totaled 593,000 pounds in 2008, with an ex-vessel value of \$1.3 million; landings at Fields Landing totaled 883,000 pounds, and were valued at \$629,000; Shelter Cove landings totaled 41,000 pounds, and were valued at \$112,000; and King Salmon landings totaled 3,000 pounds, and were valued at nearly \$9,000. The distance and dissimilarities among the ports of Trinidad, Eureka, and Shelter Cove are sufficient to warrant separate socioeconomic description of each, while close proximity and shared infrastructure allow for concurrent discussion of Eureka, Fields Landing, and King Salmon.

Between 1981 and 2009, reported landings in Humboldt County averaged 20 million pounds per year; total ex-vessel revenues averaged \$12 million.³⁰ Landings for that period peaked in 1981 at 38 million pounds, with an ex-vessel value of \$15 million. Following that peak, landings have generally trended downward. In 2009, 137 fishing operations offloaded a total of 13 million pounds; ex-vessel value was \$14 million (PacFIN 2010).

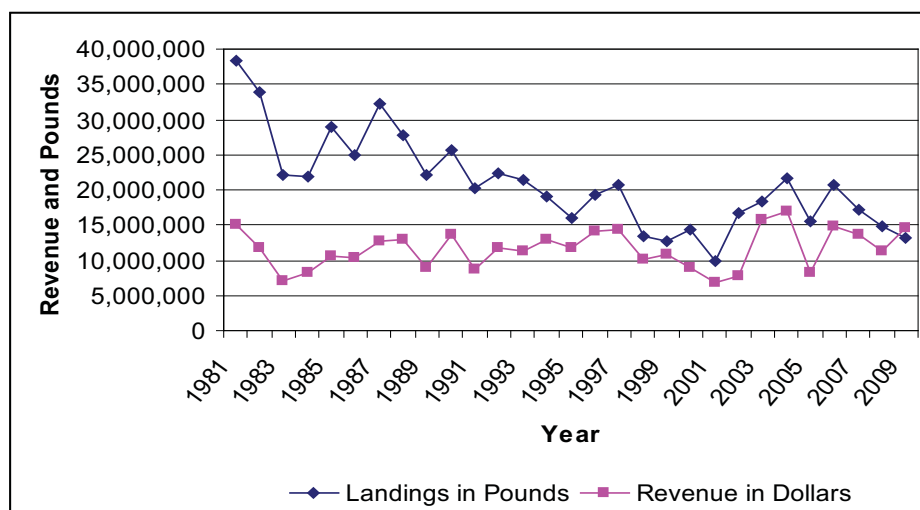


Figure 3-10 Landings vs. Revenue, Humboldt County: 1981-2009

Source: PacFIN 2010

³⁰ PacFIN landings data for Humboldt County were obtained from the Eureka-area ports of landing: Eureka, Fields Landing, and King Salmon.

Dungeness crab is the most economically important commercial fishery in Humboldt County. Between 2000 and 2008, an annual average of 4.6 million pounds of Dungeness was offloaded at Humboldt County ports of landing, with an average nominal ex-vessel value of \$7.6 million (CDFG 2009a).

Between 1981 and 2009, an average of 361 vessels offloaded at the ports of Humboldt County. Peak productivity occurred in 1981, when 1,126 captains sold their catch to buyers/processors at Humboldt County ports of landing. The size of the fleet diminished rapidly over the next several years, declining 66 percent by 1985, partly a result of evolving restrictions in the KMZ. Between 1985 and 2008 the size of the fleet fluctuated somewhat, but the overall trend was one of contraction. By 2009, the Humboldt County fleet had dwindled to 137 vessels (Figure 3-11). During the same period, the total number of fish tickets submitted to CDFG decreased by 78 percent, from 17,580 in 1981 to 3,835 in 2009 (PacFIN 2010).

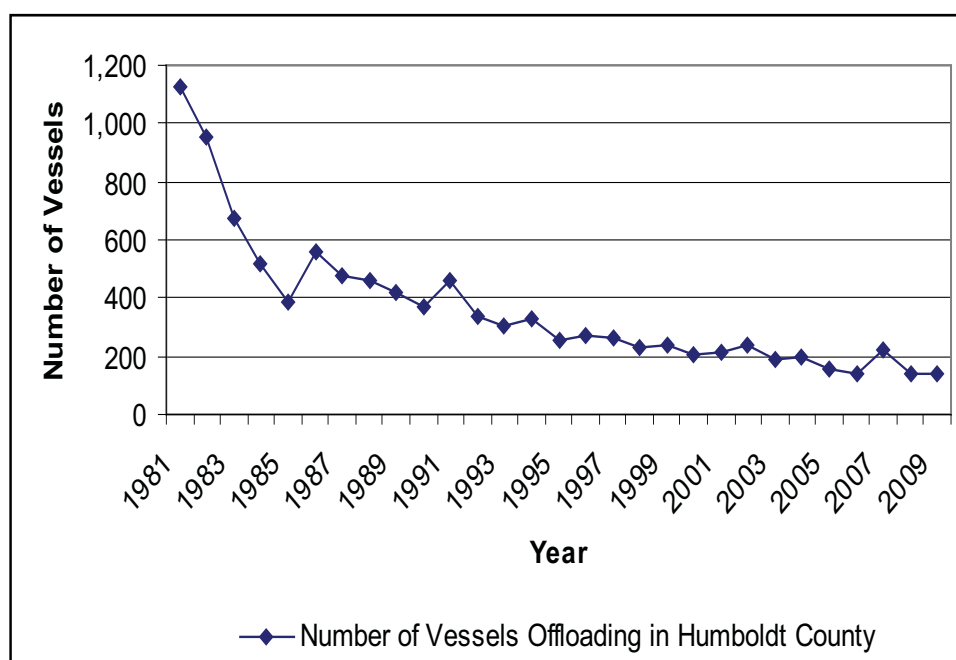


Figure 3-11 Commercial Fishing Vessels, Humboldt County: 1981-2009
Source: PacFIN 2010

The number of processors active in Humboldt County has tended to fluctuate since 1981, ranging from a low of 34 in 1989 to a high of 63 in 2002 (Figure 3-12).³¹ On average, 47 seafood processors were operating in the Humboldt area between 1981 and 2009 (PacFIN 2010). Two seafood processing and distributing firms and four buyers were active in Humboldt County in 2009; all were located in the Eureka area. Numerous area fishermen sell their catch directly to seafood restaurants, seafood markets, or other retail establishments.

Trinidad Harbor. Trinidad is the northernmost port of landing in Humboldt County. The natural harbor is approximately 25 nautical miles north of Eureka and 43 nautical miles south of Crescent City. Trinidad is used by numerous commercial and recreational fishermen, and about

³¹ Includes licensed processors, wholesalers, receivers, dealers, and retail fishermen who sell their catch to consumers.

seven charter boat captains. Trinidad Head was designated an Area of Special Biological Significance (ASBS) in 1974 and classified as a state Critical Coastal Area (CCA) in 2002. With a year 2000 population of 311, the City of Trinidad is the smallest incorporated city in the State of California (U.S. Census Bureau 2000).

Trinidad Harbor was first developed during the mid-1800s as a shipping and supply center for the mining and timber industries. By the 1870s, whaling crews were using the harbor for its safe anchorage and easy access to land. During the twentieth century, recreational anglers began frequenting Trinidad Bay to troll for salmon (Scofield 1954). Recreational and commercial salmon trolling increased markedly following completion of Trinidad Pier in 1946 and an accompanying mooring basin in 1948. A fuel dock, bait and tackle shop, restaurant, and salmon smokehouses were constructed over the next decade or so (Pomeroy et al. 2009b). By the late 1970s, hundreds of recreational anglers trolled for salmon from Trinidad Bay, and many moored around the harbor. Sharp reductions in KMZ season length, reduced bag limits, and other salmon regulations led to decline in the number of vessels mooring at the harbor. By 2008, some 90 vessels typically moored in the area during periods of favorable weather.

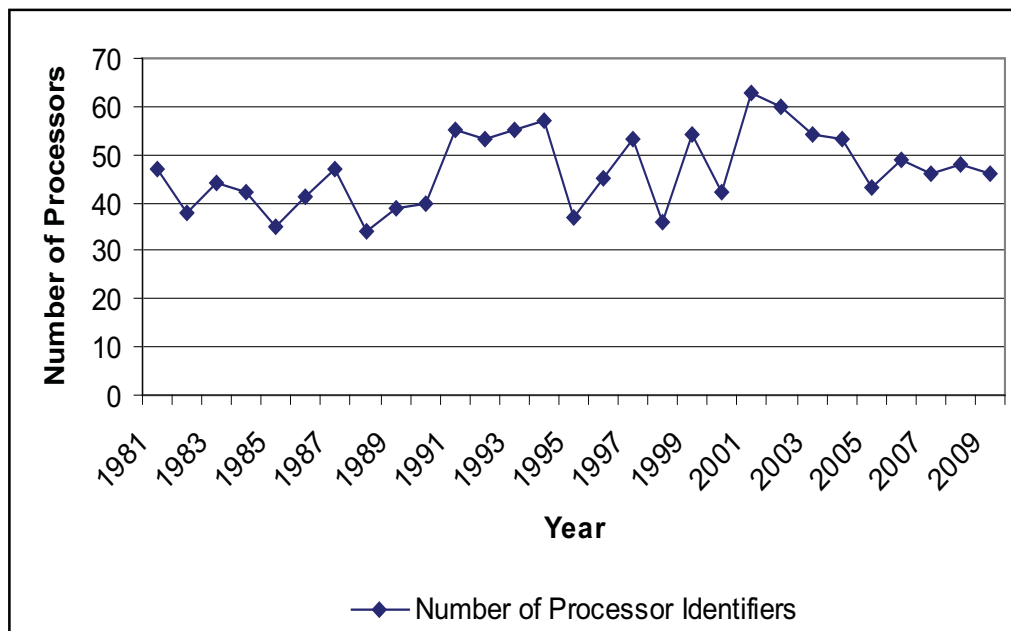


Figure 3-12 Seafood Buyers, Processors, and Distributors in Humboldt County: 1981-2009
Source: PacFIN 2010

Despite recent declines in overall angler participation, marine-related tourism and recreational fishing continue to figure prominently in Trinidad's ocean-based economy. Sloan and Rocha (2007) report that more than 12,000 tourists visit Trinidad each summer to fish for salmon, rockfish, greenling, cabezon, rock cod, surf perch, and other species. Clamming and crabbing are also popular. Local business owners report that tourism activity is an important source of revenue for the small community.

The Cher-Ae Heights Indian Community of the Trinidad Rancheria has owned and operated the Trinidad Pier since 2000. The Rancheria maintains the pier, hydraulic boat lift, receiving station

with four hoists, launching facility for vessels up to 26 feet in length, a tackle shop, and a restaurant (Table 3-11). The Rancheria charges fishermen various pier-use fees for boat launching, mooring, and offloading services, thereby covering maintenance and other costs. The harbor has no fuel dock, vessel maintenance or repair facilities, or cold storage. Fishermen necessarily patronize businesses elsewhere in the county, especially those in Eureka, to obtain supplies, services, and gear not available at Trinidad.

Captains of trailered vessels often use the launching facility at Trinidad Harbor, while captains of larger sport fishing boats, commercial fishing vessels, and charter vessels make consistent use of the mooring and offloading facilities. Most of the latter typically move their vessels to Eureka for safe anchorage during periods of high winds or heavy swells. Rancheria officials intend to replace the 60-year-old wooden pier with a modern steel and concrete structure, beginning renovations as early as 2010.

Table 3-11 Trinidad Pier User Groups, Infrastructure, and Services

User groups	Rancheria-Owned Infrastructure	Services
Commercial fishermen Recreational fishermen - Charter - Private boat Community residents Tourists	Moorings (~100 seasonal) Launch ramp (1) Parking Offloading Infrastructure - Hoists (4) - Receiving station (1) Other Infrastructure - Restaurant - Bait and tackle shop - Skiff storage racks -	Fish receiving Boat launching Water taxi Floating dock

Source: Pomeroy, C., C. Thomson, and M. Stevens 2009b

Trinidad Commercial Fisheries. In recent years, Dungeness crab has been the most economically important commercial species landed at Trinidad Harbor, followed by rockfish, salmon, and lingcod. Crab landings accounted for 96 percent of all revenue generated by fishing operations based at Trinidad Harbor in 2008 (CDFG 2009a). Since the early 1990s, regional and statewide salmon season closures have significantly reduced commercial landings of salmon at this harbor (Pomeroy et al. 2009b).

Table 3-12 Ex-Vessel Value of the Top Five Species Landed at Trinidad Harbor: 2000-2008

Species	Total Revenue (\$)	Total Landings in Pounds	Average Annual Revenue (\$)	Average Annual Landings in Pounds
Dungeness Crab	14,196,931	8,151,614	1,577,436	905,734
Black Rockfish	122,441	103,123	13,604	11,458
Chinook Salmon	88,080	29,287	9,786	3,254
Lingcod	31,269	22,448	3,474	2,494
Other Rockfish (except black)	9,684	3,151	1,076	350

Source: CDFG 2009a

During the weather-challenged winter months of 2009 - 2010, 18 commercial vessels were regularly moored at Trinidad Harbor; the majority of which were less than 36 feet in length. Most captains participated in the winter crab fishery. Seven captains, two with limited entry permits and five with open-access permits, currently participate in the commercial rockfish fishery. The rockfish/lingcod fishery includes the state-managed limited entry nearshore fishery and the federally managed groundfish fishery.

Trinidad-based fishermen typically sell their catch directly to the sole local wholesaler, or to four smaller buyers in the larger region. Many captains will take orders from retail buyers before embarking on a fishing trip, and often will fish for more than one buyer at a time. A local seafood retailer and smokehouse operator also buys seafood from the local fleet (Pomeroy et al. 2009b).

Dungeness crab season is from December 1 to July 15 in this region. Crabbers adjust effort and grounds throughout the regulatory season to meet market demands and adapt to shifting abundance and quality. From December to February, fishermen with small- to medium-sized vessels typically work in state waters just outside of Trinidad Head. In March, the crab fleet tends to work south of Trinidad Head to Mad River, and north of Patrick's Point. This late season effort is commonly referred to as "beach fishing" because it occurs just outside the surf zone. This can be both dangerous and arduous as participants often have to extricate pots that get stuck in the sand. Fishermen with smaller, more maneuverable boats are more likely to participate. By mid-May, when both the quantity and quality of the crab harvest diminishes, only a handful of fishermen continue to participate in the fishery.

Trinidad commercial fishermen sell most early season crab to an Oregon-based processor who buys in bulk. In 2009, early season crab sold for \$1.75 per pound in a flooded market. During the late season, when less crab is available at the marketplace, much higher prices are common. Nevertheless, early season volume is typically significant, and Trinidad crabbers estimate that as much as 70 percent of income is earned during the early season, and 30 percent during the late season. Late season crab is often sold to a buyer involved in the San Francisco live market.

In recent years, landings of Dungeness crab at Trinidad have averaged 1 million pounds per year, with an average ex-vessel value of \$1.6 million. Between 2000 and 2008, crab landings at Trinidad accounted for 97 percent of all fishery-specific revenue at the harbor for that period.

Trinidad Harbor lies within the Klamath Management Zone (KMZ). Prior to the establishment of the KMZ in 1979, salmon was one of the principal species landed at Trinidad. Because KMZ-specific regulations effectively reduced landings, many captains subsequently shifted into the crab fishery and some started charter operations. Today, when the KMZ season is open, the majority of Trinidad-based salmon fishermen typically offload at either Trinidad or Eureka. A few skippers will travel as far south as Point Arena to fish for salmon.

Short seasons, closures, and variable allocations within the KMZ have diminished the importance of the Trinidad area salmon fishery. Reportedly the last big season occurred in 2005, when 10,000 pounds of salmon was offloaded at Trinidad. Between 2000 and 2008, fishermen offloaded an average of 3,260 pounds of salmon, with an average ex-vessel value of \$9,800.

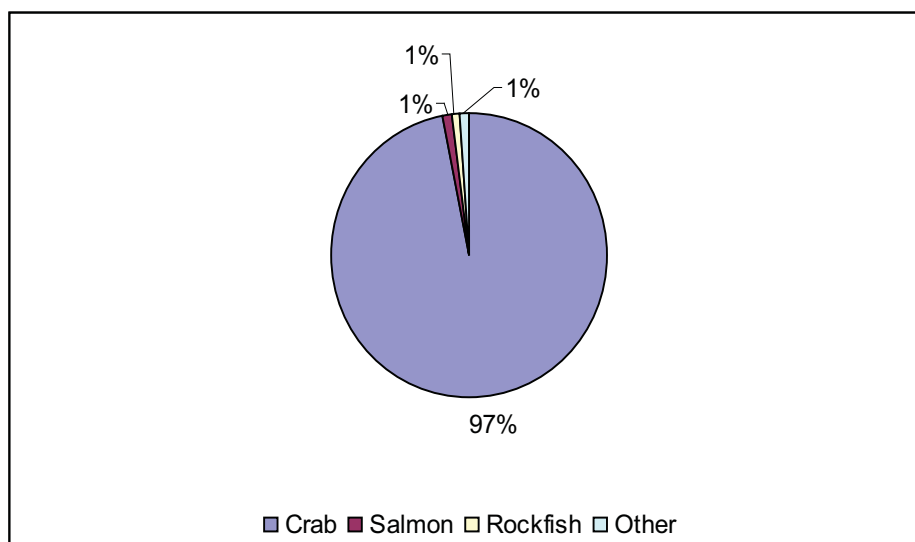


Figure 3-13 Percentage Value of Trinidad Landings: 2000-2008

Source: CDFG 2009a

While the commercial nearshore rockfish fishery is open year-round in the Trinidad region, inclement weather and sea conditions often preclude fishing activity during the winter months. Extensive fishing occurs between April and October.

The size of the resident rockfish fleet declined markedly following implementation of the limited entry program and RCAs. Currently, a small number of Trinidad area fishermen actively participate in the commercial rockfish hook-and-line fishery. Black rockfish and lingcod are the principal target species. The area from Trinidad Head to Patrick's Point is said to be ideal for black rockfish, and the Reading Rock area, some 16 nautical miles from port, is known as a productive area for lingcod. Key informants assert that the shift to a 20 fathom RCA depth restriction in 2009 led to the loss of about 60 percent of historic rockfish grounds in the Reading Rock area, and that the recent closure of the region's salmon fishery has led to increased recreational angling for rockfish around Trinidad.

Trinidad Recreational Fisheries. The Trinidad area has long been popular with recreational anglers. Residents and visitors historically targeted salmon, but the reduction in salmon fishing opportunities has led to a re-concentration of effort for other species (Pomeroy et al. 2009b). As is common along the North Coast, rough weather conditions often limit the number of days that anglers may safely fish. Boats up to 26 feet in length can pay to launch from the pier, or launch for free from the beach. Charter excursions are particularly popular with visiting anglers.

Shore-based anglers use hook-and-line to target rockfish, lingcod, cabezon, surfperch, and kelp greenling. Anglers also use poke-poles to catch rockfish and lingcod, and A-frame nets for surf smelt. Shore-gatherers target crabs, and razorback, littleneck, and gaper clams. Shore-based fishing and gathering occurs at many locations in the Trinidad area, including Agate Beach, College Cove, Indian Beach, Luffenholtz Beach, Moonstone Beach, and Trinidad State Beach. Shore-based fishing also occurs just north of Trinidad at Carruthers Cove Beach, Golds Bluff Beach, and the Orick Fishing Access. Clam Beach in McKinleyville is accessed for fishing and

clamming, and abalone gathering occurs south of the harbor from Camel Rock to Patrick's Point. Trinidad Pier is also a popular spot.

Many anglers bring their own vessels to Trinidad to pursue various finfish, including rockfish, lingcod, cabezon, and tuna. Small boat anglers, kayak fishermen, divers and shore anglers favor the rocky inshore grounds, while fishermen with larger vessels may head as far north as Reading Rock. Several productive grounds are in relatively close proximity to the harbor. When salmon season is open, boat anglers troll from the nearshore zone to about six miles offshore, north to Patrick's Point and south to Mad River. The recreational crab effort is concentrated in areas south of Trinidad Harbor to Little River. Some anglers are now targeting Pacific halibut in federal waters due to decreased salmon and rockfish fishing opportunities.

The popularity of kayak fishing has increased during the last decade. Currently, about ten local kayakers fish around the harbor area and beyond. Kayak fishermen use hook-and-line to target rockfish and lingcod; some also set crab pots. Prime fishing grounds extend north to Patrick's Point. Trinidad Head provides kayakers with some protection from challenging sea conditions.

Frequently adverse weather and sea conditions make diving in Humboldt a challenging endeavor. However, Trinidad Head provides shelter from wind, seas, and certain swell directions, making it a relatively safe and accessible diving location. Spearfishers target rockfish, cabezon, lingcod, and California halibut in Trinidad Harbor. Divers also take abalone in the protected cove areas south of the pier and in the rocky inshore areas from the harbor to Patrick's Point. Land access north of Trinidad Head is constrained by steep trails, private property, and park entrance fees. Waters are not protected from swells, making the area less suitable for all except advanced divers. Some advanced divers favor Reading Rock for offshore pinnacle diving. One avid diver describes Reading Rock as "the safest, easiest, and clearest place for diving outside Mendocino." Divers target scallops, black rockfish, and lingcod at this location.

Charter fishing-related tourism is an important aspect of the local economy. Currently, seven charter captains operate from Trinidad Harbor. One reports that nearly all of the 500 clients he serves each summer are from the Redding and Sacramento areas. Visitors typically stay in local hotels or campsites, and patronize local retail establishments.

Captains typically lead their patrons to black, brown, blue, and China rockfish; salmon; kelp greenling; lingcod; and Pacific halibut. One skipper describes the rocky headlands around Trinidad as the "bread and butter" of the local charter industry, and estimates that he takes 90 percent of his clients there. The close proximity of prime rockfish habitat along the headlands permits operators to run two half-day charters. A few charter operators also offer the lengthier trip to Reading Rock, although this is reportedly less frequently the case given loss of prime rockfish and lingcod grounds in the area. Some charter operators are now offering combination rockfish/crab trips, albacore trips, and/or Pacific halibut trips in the wake of decreasing opportunities for salmon and rockfish fishing.

Eureka, King Salmon, and Fields Landing. The City of Eureka is 21 miles south of Trinidad Head, some 60 miles north of Shelter Cove, and immediately adjacent to central Humboldt Bay,

the only deepwater port between San Francisco and Coos Bay, Oregon, and the largest estuary in Northern California. According to Norman et al. (2007:419), Humboldt Bay is comprised of many complex habitats that support 95 species of fish, more than 180 species of invertebrates, and 30 species of mussels, oysters, and clams.

Eureka was established in the mid-1800s as a port of entrance and supply center for the mining industry. After the Gold Rush subsided, settlers used the port for distributing fish and timber. Salmon and shark were among the first commercial fisheries to develop. Shark liver oil was valued during this period as a source of Vitamin A (Planwest Partners, Inc. 2008; Scofield 1954).

Today, the commercial fishing continues to be an important industry in the region. In 2008, 140 fishing operations offloaded 14 million pounds of seafood at Eureka processing and distribution facilities. The catch was worth some \$10 million in ex-vessel value (PacFIN 2008).

The Woodley Island Marina and the Eureka Public Marina are the principal berthing facilities in the Eureka area. Although numerous commercial vessels use the Woodley Island facility, both marinas accommodate commercial, recreational, and charter boat operators. Four public boat ramps serve the area. As noted in Table 3-13, key elements of the physical infrastructure includes: four offloading facilities, several work stations, hoists, a fuel dock, two boatyards, dry storage, a fishing pier, and an ice plant.

Table 3-13 Eureka-area User Groups, Infrastructure, and Services

Location	Primary Facilities	Owner/Operator(s)	Services	User Groups†
Eureka	Woodley Island Marina	HBHRC	Berthing (237 slips), utilities, work area, storage	C, R, AR, T
	K Street Dock	City of Eureka/Caito Fisheries	Offloading, tie-ups	C
	Commercial Street Dock	City of Eureka/Pacific Choice Seafood. Englund Marine	Offloading, fuel, marine supply, tie-ups	C
	Dock B ³²	City of Eureka/Wild Planet, Humboldt Seafood Unloaders	Offloading, tie-ups	C
	Eureka Public Marina	City of Eureka	Berthing (160 slips, plus side-ties), utilities, launch ramp, storage	C, R, AR, T
	Fishermen's Work Area/C Street	City of Eureka	420 ft dock, 4 jib cranes, work area	C
King Salmon	Johnny's Marina and RV	Privately owned	50 slips, utilities, fuel, bait, RV park	R, AR
	EZ Marina and RV Park	Privately owned	28 slips, fuel, bait, ice	R, AR
	Local Seafood Co. Dock	Privately owned	8 docking spaces, hoist, fish cleaning station	C
Fields Landing	Boat Repair Yard	HBHRC	Boat repair, offloading, public boat launch, public dry dock	C, R, AR

†User Groups: C = commercial fishermen, R = recreational fishermen, AR = area residents, T = tourists
Source: Pomeroy, C., C. Thomson, and M. Stevens 2010a; IAI 2010

³² Following the January 2010 earthquake, the two active buyers at Dock B were relocated to temporary facilities at the foot of C and D Streets, while the City's Fishermen's Terminal is under construction (Pomeroy et al. 2010).

The primary offloading facilities in the Eureka area are the K Street Dock, the Commercial Street Dock, Dock B, and Fields Landing. Commercial fishermen occasionally offload small amounts of crab and tuna at King Salmon. Pomeroy et al. (2010a) report that, at least 20 Eureka-area businesses provide direct support to the commercial and recreational fishing fleets.

The King Salmon area is located approximately four miles south of Eureka on the southeastern perimeter of Humboldt Bay. Recreational anglers have long trolled for salmon in this area (Scofield 1954). Today, two privately owned marinas serve recreational boaters and anglers. One marina includes approximately 50 slips for vessels less than 24 feet in length, a bait shop, fuel pump, and 54 parking spaces. The second provides dock space for approximately 28 vessels up to 22 feet in length, a fuel, bait, and ice retail business, and 83 parking spaces. In total, 137 parking spaces are available at the two marinas; many are used for trailers and other recreational vehicles (RVs). About 120 such spaces are occupied by longtime residents, a trend which has reportedly increased in recent years as residents seek affordable housing alternatives. Marina owners report that fewer visitors have rented RV and dock space following establishment of the KMZ and other management measures that restrict salmon fishing.

Docks attached to private residences also line the many inland channels of King Salmon. Although recreational fishermen are the principal users of the privately owned docks, certain commercial fishermen may occasionally offload through arrangements with the owners. Of the combined 86 slips available in the King Salmon area, only about 15 are occupied on a year-round basis. Most are recreational fishing vessels. Popular forms of recreational fishing occurring from this area include use of static hook-and-line gear for rockfish and halibut, and troll gear for salmon. Crab pots are also commonly deployed.

The unincorporated community of Fields Landing is located approximately five miles south of Eureka. Fields Landing first developed in the 1880s as a point of transshipment for timber products. From 1938 to 1950, the last active whaling station in the United States operated from Fields Landing. The station was converted to a fish reduction cannery and by the early 1950s, the area had become “a well-equipped fishing port” with “three [distribution] plants with docks, hoists, scales and modern equipment for handling fish” (Scofield 1954: 36).

Today, Fields Landing is utilized mainly by recreational fishermen, although some commercial landings are tendered here, primarily Dungeness crab, hagfish, and groundfish. Recreational anglers use the public boat launch, which accommodates vessels up to 40 feet in length. Public space is available for vessel maintenance and repair.

Eureka-area Commercial Fisheries. Currently, between 100 and 120 commercial fishing vessel owners call Eureka their homeport (North Coast Strategy for Economic Development 2007). The contemporary local fleet includes some 80 crabbers, 15 to 20 salmon trollers, eight to ten trawlers, and five to ten smaller groundfish vessels that primarily target sablefish and other nearshore species (Pomeroy et al. 2010a). Dungeness crab is the most lucrative species landed at Eureka-area ports. Other important fisheries include trawl for groundfish, Pacific whiting, and ocean shrimp; troll for albacore tuna; and barrel trap for hagfish.

Table 3-14 Ex-Vessel Value for the Top Five Species Landed at Eureka: 2000-2008

Species	Total Revenue (\$)	Total Landings in Pounds	Average Annual Revenue (\$)	Average Annual Landings in Pounds
Dungeness Crab	37,798,597	22,557,178	4,199,844	2,506,353
Sablefish	9,390,231	7,135,716	1,043,359	792,857
Dover Sole	6,052,997	17,335,405	672,555	1,926,156
Albacore Tuna	4,397,436	5,783,239	488,604	642,582
Petrale Sole	2,797,921	3,727,444	310,880	414,460

Source: CDFG 2009a

Pomeroy et al. (2010a) enumerate four principal seafood distributors and two processor-distributors in various locations along the Eureka waterfront. Three of the six firms typically receive more than 80 percent of Eureka area landings. The largest processing operation leases a 50,000 foot facility from the City of Eureka, where it handles groundfish, crab, albacore tuna, ocean shrimp and, when available, salmon. The processor also employs about 170 persons on average (North Coast Strategy for Economic Development 2007). A second Eureka-based processor specializes in crab. Some is processed on site, but the majority is transported to a larger facility in Fort Bragg. Indeed, a large percentage of seafood landed in Eureka is trucked elsewhere, though several retailers, grocery stores, and restaurants sell locally landed seafood. The vast majority of commercial fishermen in Eureka participate in the crab fishery. Vessels range from 40 feet to 85 feet in length, and average 50 feet in length. Fishermen typically set between 360 and 700 pots, depending on vessel size. Crab trips can last up to three days, depending on the proximity of the crab grounds to the port of delivery, the holding capacity of the vessel, and any delivery constraints set by the buyer. Captains typically employ two persons as crew.

Crab season is December 1 to July 15. During peak season in December, captains retrieve, unload, and re-bait pots on a daily basis, weather permitting. Crab fishermen often characterize February and March as “difficult months,” when crab abundance generally wanes. The cycle of abundance often waxes again in late March and April. Fishermen shift their grounds during the course of the season, generally moving from deeper to more shallow waters. Late season crab yields a higher ex-vessel price, and many captains with small vessels participate.

Crab habitat is extensive in the Eureka area. Crab grounds extend from about three fathoms to 100 fathoms, with most effort occurring between 20 and 60 fathoms. “Hotspots” for crab change between and within seasons. Large vessels with the capacity to retrieve pots from greater depths and which are capable of withstanding harsher weather conditions tend to crab in deeper waters. Captains with smaller vessels tend to fish closer to the shore. Although crab grounds are extensive, respondents report that they typically interact with numerous other crab vessels in any given area.

In general, Eureka-area crab fishermen will set their pots as far north as Trinidad or Reading Rock, and as far south as Cape Mendocino or the Mattole River. Crab grounds located south of the Bay entrance are known for abundance, but weather, current, and muddy bottoms make conditions here more challenging. Some Eureka-based crab fishermen favor an area to the northwest of the Bay since it is both close and productive.

Some Eureka-area captains participate in the early opener in District 10 south of Point Arena. Captains with vessels greater than about 50 feet in length participate, since they can carry enough pots to make the trip profitable. Captains with smaller vessels occasionally truck pots to participate in crab fisheries to the south. A small number of captains participate in Oregon and Washington crab fisheries.

As Pomeroy et al. (2010a) report, the number of boats participating in the Eureka-area crab fishery has declined from 205 vessels in 1981 to 94 in 2007. The number of large processor/buyers in the Eureka area also has contracted from ten to three during the last decade or so. Despite fewer participants in the various sectors of the fishery, key informants point out that the economic importance of the crab fishery has increased as other fisheries, such as salmon, groundfish, and pink shrimp have diminished as a result of regulatory strictures.

Most Eureka-area crab fishermen also participate in other fisheries, as seasons and regulations permit. The most common seasonal rounds are, in descending order of frequency: crab, salmon and albacore tuna; crab and groundfish trawl; crab, salmon, sablefish, and albacore tuna; and crab, albacore tuna, and sablefish.

Between 2000 and 2008, an annual average of 4.6 million pounds of Dungeness crab, with a corresponding nominal ex-vessel value of \$7.6 million, was offloaded at Eureka-area ports. Crab landings at Eureka-area harbors accounted for 46 percent of all fishery-specific revenue at Eureka-area ports for that period (CDFG 2009a).

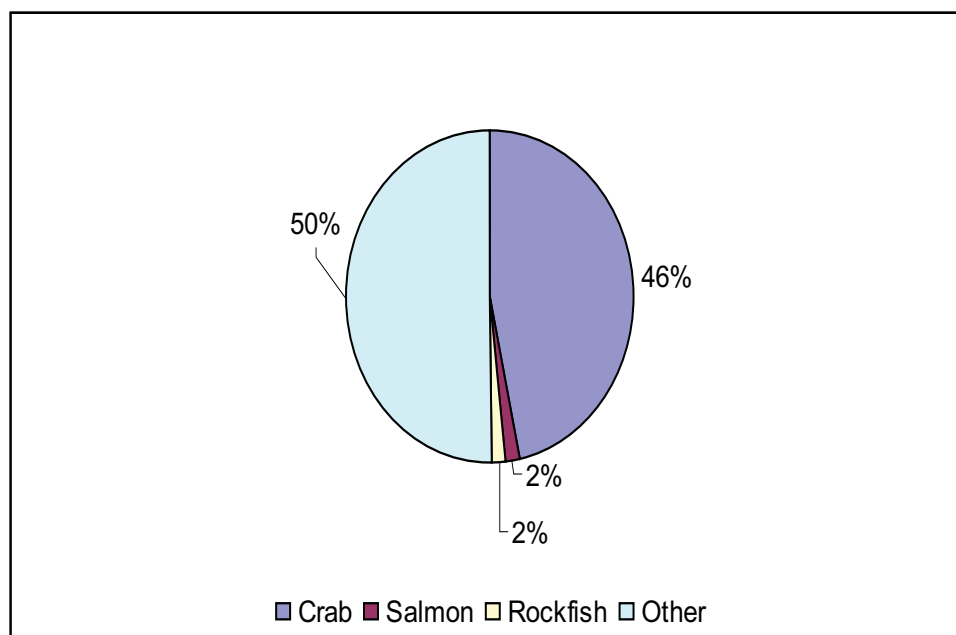


Figure 3-14 Percentage Value of Eureka-area Landings: 2000-2008

Source: CDFG 2009a

Dungeness crab is also the most important species offloaded at Fields Landing (Table 3-15). Other species, such as hagfish, sablefish, and Dover sole, have been economically important during certain years, but volume varies extensively due to abundance, fluctuating market

demand, and other factors. Relatively small amounts of Dungeness are offloaded at King Salmon; between 2004 and 2008, fishermen offloaded 20,600 pounds of crab at this location. Fishermen have delivered tuna and salmon to King Salmon in recent years, but only in small amounts.

Table 3-15 Ex-Vessel Value of the Top Five Species Landed at Fields Landing Harbor: 2000-2008

Species	Total Revenue (\$)	Total Landings in Pounds	Average Annual Revenue (\$)	Average Annual Landings in Pounds
Dungeness Crab	1,237,718	770,235	137,524	85,581
Hagfish	600,656	1,164,928	66,739	129,436
Sablefish	497,177	416,278	55,241	46,253
Dover Sole	281,262	872,154	31,251	96,906
Rockfish	210,339	486,552	23,371	54,061

Source: CDFG 2009a

The commercial and recreational salmon fisheries conducted from the Eureka area are subject to various KMZ regulations. As such, some respondents report shifting effort to other species, such as rockfish, crab, sablefish, and albacore tuna, and traveling south of the KMZ to fish for salmon.

Currently, 20 to 30 Eureka-area-based commercial fishermen participate in the salmon fishery, as regulations permit. Vessels range from 35 to 55 feet in length. Prior to the statewide salmon closures, some respondents traveled as far south as Monterey County. Some Eureka-based fishermen also hold salmon permits in Oregon and report traveling as far north as Newport. More typically, respondents concentrate effort from Point Reyes north. Between 2000 and 2008, salmon landings at Eureka-area harbors accounted for about two percent of all fishery-specific revenue.

In the Eureka area, salmon run offshore during the months of April and May, and gradually move inshore between June and August. By September, the salmon begin migrating into deeper offshore waters. Eureka-based fishermen troll in much of the nearshore zone and as far offshore as 30 miles, in waters as deep as 700 feet.

Eureka fishermen tend to sell their salmon to buyers with whom they have an established relationship. When they offload at ports other than Eureka, many sell to the highest bidder. Ex-vessel prices for salmon are higher at the beginning and end of a given season, when demand is relatively high and supply is relatively low. The mid-season market is often flooded with salmon from the Alaska salmon fisheries.

With regard to rockfish, the Eureka-area fishing grounds once supported a thriving commercial nearshore rockfish fishery. A fleet of 10 to 12 vessels was active in the 1990s. But the fishery has declined markedly since 2000 and there currently are no active permit holders based in Eureka. Many factors have contributed to the decline of the fishery. Distance to the grounds was a challenge. The nearest grounds are in Trinidad, 15 miles north, and some Eureka-based fishermen would travel as far north as Point St. George and as far south as Cape Mendocino in pursuit of rockfish. Moreover, several regulatory factors reportedly constrained the fleet, most especially the RCAs.

Eureka-area Recreational Fisheries. Extensive boat-based recreational fishing is conducted from the Eureka Public Marina, the Woodley Island Marina, two privately owned marinas in King Salmon, and four public boat ramps. Shoreline fishing is popular among residents and visitors, and charter fishing and sightseeing excursions are popular tourist activities.

Shoreline anglers can fish from one of Humboldt Bay's many rocky banks, beaches, piers, or jetties.³³ Jetties and piers often yield lingcod, rockfish, shark, surfperch, California halibut, bat rays, and even salmon during the late summer months (Fritzsche and Cavanagh 2007). Redtail perch, a popular sport fish, is pursued by light-tackle enthusiasts in shallow waters, such as those around the power plant at King Salmon and the mouth of the Elk River.

Shellfish enthusiasts gather razorback, littleneck, and gaper clams along the shores of Humboldt Bay, at "Clam Island," and various other locations in the south bay. Shoreline fishermen sometimes use A-frame nets to catch surf smelt along the sandy beaches northwest and southwest of the entrance to Humboldt Bay. Additional shore-based fishing areas in the immediate Eureka areas include Clam Beach County Park in McKinleyville and Centerville Beach County Park in Ferndale.

The number of private boaters fishing from the bay fluctuates seasonally. When salmon are running and as regulations permit, an estimated 300 boats might be used to access the ocean waters from marinas in the Eureka area. When the tuna bite is on, some 50 locally based recreational captains typically participate, along with a larger number of captains who trailer their vessels to Eureka from adjacent areas. During good weather and sea conditions, some 20 captains may set out for Cape Mendocino to target rockfish.

Resident anglers typically fish for a variety of species. According to Pomeroy et al. (2010a), the most avid Eureka recreational anglers fish year-round, pursuing crab in the winter and late spring, California and/or Pacific halibut in the summer, albacore in late summer, rockfish from mid-May to mid-September, and salmon when the season is open. Overlapping seasons allow anglers to take multiple species in a single trip. Many avid boat fishermen also fish from shore or dive for abalone. When the weather is rough, some anglers fish in Humboldt Bay for California halibut, shark, and bat ray.

Prime rockfish grounds for Eureka area fishermen lie south of the bay, from Mussel Rock (False Cape) to Cape Mendocino, some 15-20 nautical miles distant from the bay entrance. Winds and waves often become increasingly challenging south of Eel River; fishermen with large vessels and strong inclinations tend to fish south of Cape Mendocino. Extensive crab grounds lie in close proximity to the entrance of Humboldt Bay. Pacific halibut are found in federal waters outside the Bay; California halibut, shark and bat ray are often caught within the Bay. Albacore appears intermittently off the coast of Eureka. Anglers with larger vessels may travel up to 70 miles offshore in pursuit of tuna.

³³ These areas include the Fields Landing Boat Ramp, the "F" St. Dock, Samoa Boat Ramp, Bonnie Gool Guest Dock, Adorni Center Dock, and the Del Norte St. Pier.

Until the recent closures, the majority of non-resident anglers came to Eureka to fish for salmon. Popular salmon troll grounds extend approximately six miles north and south of the harbor, and range in depth from 10 to 100 fathoms.

Resident and non-resident anglers fish for the challenge, for pleasure and relaxation, and other reasons. Fishing for food is certainly important. Many residents have been consuming and sharing finfish and shellfish for generations. Seafood remains a critically important part of local culture and the associated dietary patterns of many residents. Socioeconomic status is an important consideration here in that personal capture and familial/inter-familial sharing of locally caught seafood have become increasingly important aspects of community life during the current economic recession. It is notable that pursuit and use of seafood can vary across cultural or ethnic groups. For instance, a number of new residents of Hmong and Laotian ancestry now often target surfperch for purposes of subsistence.

Recreational fishing activities reportedly have declined in the Eureka area during the last two decades. Local participants link the decline to increasingly restricted salmon and groundfish angling opportunities beginning in the 1990s. For instance, the recreational salmon fishery has been subject to seasonal and bag limit restrictions associated with the KMZ, and the recent statewide closures resulted in decreasing revenues for the harbors and fishing-related businesses.

In the early 1950s, four party boats and two charter boats operated from Eureka, and numerous privately owned boats trolled the bay. Salmon was the primary target (Scofield 1954). Today, three six-pack vessels operate from Eureka's Woodley Island Marina, and the recreational effort has shifted from salmon to rockfish, California halibut, and Pacific halibut (all hook-and-line). Crab is also sometimes targeted. Because the California halibut fishery occurs primarily in Humboldt Bay, overhead is low and operators can take clients even during somewhat inclement weather.

Reportedly, demand for services such as dinner cruises, dive trips, and whale-watching is minimal in the Eureka area. Skippers describe whale-watching as "not worth the cost," given the unpredictability of the weather during whale season and long distance to areas where whales may be sighted.

Safe and productive dive spots in the Eureka area are few and inshore waters tend to be murky. Some spear fishermen target rockfish, lingcod, California halibut, and scallops at the north spit of Humboldt Bay. Advanced divers prefer conditions at Cape Mendocino, some 25 nautical miles south of Eureka.

Shelter Cove. Shelter Cove is located about 60 miles south of Eureka and 45 miles north of Fort Bragg. The only launch site between Humboldt Bay and Fort Bragg is located at Shelter Cove. The community is geographically isolated. Road access is challenging, but there is an airstrip for private planes. Despite the inherent difficulties of accessing the community of Shelter Cove, it is a popular destination for recreational anglers. Its year-round population of about 500 persons swells to nearly 2,000 during the summer months, when tourists and Humboldt County residents with second homes visit the area (Humboldt Local Agency Formation Commission 2009). Many visitors are residents of Redding and the Sacramento Valley area. The majority of local business

owners are dependent on visiting recreational fishermen and tourists who patronize hotels, the local campground, gas stations, stores, and restaurants.

A small receiving and processing station for ocean salmon was established at Shelter Cove in 1926. The station ceased operating in 1937, when the poorly maintained pier was washed out by winter storms (Scofield 1954). In the late-1940s, local entrepreneurs initiated a small boat rental and sport fishing business in Shelter Cove. Recreational salmon fishing became increasingly popular during the 1960s. In 1970, skiff fishermen landed 2,000 pounds of salmon at Shelter Cove. Sport fishing and recreational use of the area increased once public access to the privately owned beach was granted in the mid-1970s (Machi 1984).

Commercial fishing activity increased significantly during the 1970s, and by 1979, some 70 fishermen landed 200,000 pounds of salmon at Shelter Cove. Most fishermen used small skiffs (Machi 1984). Rockfish, crab, and abalone were also pursued from Shelter Cove during the 1970s. Located just south of the KMZ, Shelter Cove was a key point of access for salmon fishermen during the 1980s. As many as 55 commercial fishermen trolled for salmon from Shelter Cove during the height of the fishery in the mid-1980s.

Shelter Cove has no berthing facilities, but fishermen can drop a nchor here during mild weather, and the cove itself provides some protection from north and northwest swells. A breakwater offers further protection. The breakwater, ramp, and other facilities are maintained by the Humboldt Bay Harbor, Recreation and Conservation District (HBHRCD). There is no fuel dock. Light tackle is available for purchase at the local campground, and fuel is sold at the general store. Fishermen can hire a privately owned tractor service for assistance launching their vessels, as the access leading to cove waters is quite steep. The nearest full-service tackle and gear shop is in Garberville, an approximately 45-minute drive from Shelter Cove.

Shelter Cove-Area Commercial Fisheries. The Shelter Cove-based commercial fishing fleet historically has been focused on salmon and rockfish. Reduced opportunities to fish for these species have led to significant attrition in the size of the local fleets. The resident fleet now consists of three full-time and two part-time commercial fishermen who live in the immediate and surrounding areas. The fishermen tend to target crab, rockfish, California halibut and, when regulations permit, salmon. All use aluminum or fiberglass skiffs with outboard motors. The most economically important commercial fisheries in recent years have been Chinook salmon and Dungeness crab.

Table 3-16 Ex-Vessel Value of the Top Five Species Landed at Shelter Cove Harbor: 2000-2008

Species	Total Revenue (\$)	Total Landings in Pounds	Average Annual Revenue (\$)	Average Annual Landings in Pounds
Chinook Salmon	470,915	201,694	52,323	22,140
Dungeness Crab	231,047	95,479	25,671	10,609
Rockfish, assorted	94,579	53,539	10,508	5,948
Red Sea Urchin	92,481	13,410	10,275	1,490
Lingcod	34,436	13,993	3,826	1,554

Source: CDFG 2009a

There are no buyers, seafood processing facilities, or distributors located in or directly servicing Shelter Cove. Fishermen sell their catch to the public and/or to local restaurants and retail establishments, and larger loads of Dungeness will often be delivered to other ports. Local fishermen have also occasionally shipped salmon to buyers in Eureka. The small fleet, relatively low volume of landings, and geographic isolation reportedly deter seafood firms from establishing operations in Shelter Cove. Lack of a buyer at Shelter Cove reportedly impedes commercial fishing activity in the area.

Although vessel size limits the Shelter Cove crab fleet to grounds no more than 30 fathoms in depth, productive grounds lie in fairly close proximity to port. Crab fishermen set pots south of Delgada Canyon and north of Whale Gulch. Captains with large vessels from Noyo/Fort Bragg and Eureka also target crab in Shelter Cove waters; however, they tend to set their pots in deeper waters than those favored by Shelter Cove-based fishermen.

Between 2000 and 2008, crab landings at Shelter Cove averaged 10,600 pounds per year, with an average ex-vessel value of \$46,000. Crab landings accounted for 27 percent of all fishery-specific revenue at the harbor for that period.

Between 2000 and 2008, salmon landings at Shelter Cove accounted for 54 percent of all fishery-specific revenue at the harbor for that period. Shelter Cove is also an important point of access for commercial and recreational salmon fishermen around the larger area. Eureka-area fishermen often travel to Shelter Cove to fish in non-KMZ waters.

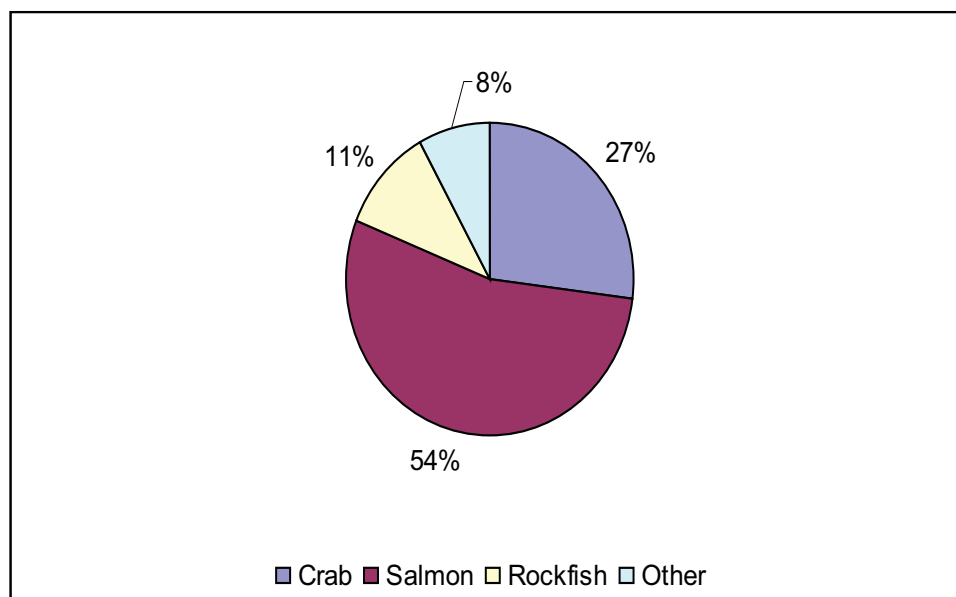


Figure 3-15 Percentage Value of Shelter Cove Landings: 2000-2008
Source: CDFG 2009a

Until the mid-1980s, as many as 55 resident fishermen participated in the Shelter Cove-area salmon fishery. Many fishermen reportedly left the fishery in the mid-1980s when regulations limited the number of allowable commercial fishing days from seven to three. Following this regulatory change, the resident fleet of 55 dropped to 25. Again, currently fewer than five local

fishermen participate in the salmon fishery. Popular troll grounds extend from six miles north of the cove to ten miles south of the cove, and about five miles offshore.

The Shelter Cove-area nearshore rockfish fishery first developed in the mid to late 1990s as a live fish fishery. At that time, a buyer from Oakland would come to Shelter Cove to purchase from local fishermen. This was discontinued following implementation of the nearshore limited entry program in 2000 and the shallow nearshore and deeper nearshore permit system in 2002. Too few fishermen received permits to sustain the buyer's interest.

Nearshore rockfish grounds are located within five miles north and south of the cove. Most fishermen take half-day trips and fish alone. Between 2000 and 2008, commercial rockfish landings at Shelter Cove accounted for 11 percent all fishery-specific revenue at the harbor for that period.

Local fishermen report that their participation in the nearshore rockfish fishery is constrained in several respects. Constraints include: limited quotas in conjunction with seasonal restrictions; inadequate bait supplies; a dilapidated breakwater that does not provide sufficient protection when launching, and RCA depth restrictions for commercial fixed-gear vessels.

Some fishermen currently target deeper nearshore species, while also participating in the open-access rockfish and lingcod fisheries. Currently, the open-access lingcod fishery is closed December through April, and the rockfish fishery is closed March through April south of 40°10'. Although open-access lingcod quotas are limited, one fisherman described the fishery as his "bread and butter." Due to market, regulatory, and other constraints, however, most fishermen supplement their commercial fishing earnings with other forms of income.

Shelter Cove-Area Recreational Fisheries. Many visitors regard the Shelter Cove area as a prime destination for recreational fishing, and all modes of fishing occur here. Many residents also fish for purposes of recreation and consumption. Rockfish is often pursued, but anglers also target surfperch, California and Pacific halibut, albacore tuna, sanddabs, sharks, Dungeness, coonstripe shrimp, and lingcod. Local anglers say they commonly share their catch with family, friends, and elderly community members who can no longer fish. Some respondents said they now freeze more fish and crab than they did prior to the establishment of recreational rockfish seasons and regulations.

Shore-based angling occurs at Delgada Point and from the jetty at the cove. Little Black Sands Beach and Dead Man's Beach are also popular with shore-based fishermen. Anglers often catch species that favor sandy bottoms and kelp beds, such as redbait perch, calico rockfish, walleye perch, and striped surfperch. The shore-based season is open year-round. Mussels and abalone are gathered during low tide. Abalone picking occurs north of the harbor along the rocky shoreline of Delgada Point.

The state recreational groundfish season runs from mid-June to mid-August south of 40°10' and through mid-September north of 40°10'. Anglers target California halibut in shallow waters from five to 60 feet, and Pacific halibut in deeper waters. Both are hook-and-line fisheries. Fishermen occasionally venture into deeper waters to target albacore tuna. This typically occurs in late

summer and early fall. Other hook-and-line fishermen target species found in nearshore waters up to 120 feet in depth, including rockfish, lingcod, kelp greenling, and bocaccio.

Launching from Shelter Cove can be difficult year-round. Swells can be formidable and winds unpredictable. Each day and area presents anglers with unique challenges. A strong northerly wind often creates rough, choppy conditions in the unsheltered waters found at Rodger's Break, some 23 nautical miles north of the harbor. The grounds south of the harbor are sheltered, but returning to port can be challenging if the winds increase unexpectedly. One fisherman describes the recreational season as "short and dangerous, but that's how we get our food."

Kayak fishing has increased in recent years. Kayak anglers can launch from the cove and fish in the protected waters to the south or at the point. Divers also can access their chosen grounds via motorized vessels, kayaks, or pangas. Divers target abalone in the Sinkyone Wilderness State Park to the south of Shelter Cove from Needle Rock to Bear Harbor, but access is difficult, water visibility is poor, and sharks are not uncommon. Little fishing activity occurs north of Shelter Cove in the Lost Coast Wilderness area. Many divers prefer the abalone grounds further south in the Fort Bragg area.

The Shelter Cove economy has long been based largely in timber, commercial and recreational fishing, local charter operations, and the interface between fishing and tourism sectors. Timber production has diminished along with many jobs in the industry. Thus, the recent salmon season closures affected the local economy as a whole. The problem is exemplified in the charter salmon fishery, where one captain reported that 30 scheduled charter trips had to be cancelled following closure of the 2008 salmon season. The captain also asserted that in 2009, only about 25 recreational boat anglers participated in the ten-day salmon opener, instead of the customary 70 to 80 boat-based anglers.

Tourism has become increasingly important in the Shelter Cove area. Some residents explain that they moved to Shelter Cove to enjoy fishing during their retirement years. However, some of the amenities that once supported Shelter Cove's recreational fishing and tourism industries are no longer functioning. In 2002, the marina hotel, full-service restaurant, gear and tackle shop, and ice facility were sold to an absentee land owner. Much of that infrastructure has deteriorated. One harbor employee speculates that, given the current economic downturn, the owner has little financial incentive to improve the facilities.

Regular restaurant service is important for maintaining tourism in the area. However, few restaurants in Shelter Cove operate seasonally as there is not enough local business to sustain full-time operation. One innkeeper describes the businesses in Shelter Cove as interrelated: "when one drops off, we are all affected."

The campground is particularly dependent on tourism. Peak camping season coincides with the recreational salmon, rockfish, and abalone seasons, between April and September. The eight-acre campground offers extensive camping and recreational vehicle sites, with overflow capacity. The campground store sells some tackle and food items.

The campground occupancy rates have been relatively low in recent years due to salmon closures and/or limited salmon seasons. Low occupancy rates have, in turn, resulted in sporadic availability of the tractor service needed to assist with boat launching. Some residents fear that lack of a full-time tractor service may deter recreational anglers from returning to Shelter Cove in the future.

Currently, local plans for economic improvement hinge on increasing Shelter Cove's tourism base, and increasing its potential for residential growth. However, community officials assert that current management measures limiting recreational rockfish take, and the recent salmon closure,s are tending to constrain growth of the recreational fishing industry in the area. The economic recession clearly is deterring residential growth.

The Mattole Coastline. The Mattole Coastline is located approximately midway between the study communities of Eureka and Shelter Cove. Although not an area of importance to the North Coast commercial fishing fleet, it is important in recreational terms. Residents of Petrolia and nearby Honeydew harvest a variety of seafood along the Mattole coastline, and numerous visitors participate in the abalone fishery.

The community of Petrolia is located five miles inland from the Mattole coastline at the northern boundary to the Lost Coast Wilderness Area. Petrolia is home to approximately 300 residents. The coastline in this area is rugged and isolated. Recreational anglers access fishing grounds by kayak and motorized inflatable boats. Both launch directly from the beach; there are no boat launches, docks, or piers. Along the shoreline, anglers cast for rockfish and surfperch, gather seaweed, collect mussels, and shore-pick and dive for abalone. In 2007, nearly 1,500 abalone were collected from the area between Punta Gorda and Cape Mendocino.

Mendocino County. The principal ports of landing in Mendocino County are Noyo (Fort Bragg), Albion, and Point Arena. Between 1981 and 2009, total reported landings in Mendocino County averaged 14 million pounds per year; total ex-vessel revenues averaged \$9 million. Landings for that period peaked in 1988 at 39 million pounds, with an ex-vessel value of \$22 million. Following that peak, catch, effort, and value decreased significantly. In 2009, 102 fishing operations offloaded a total of 7.6 million pounds of seafood; ex-vessel values were \$6.9 million (PacFIN 2010).

The number of commercial fishermen active in Mendocino County contracted considerably between 1981 and 2007 (Figure 3-17). The number of active vessels dropped from 995 in 1981 to 102 in 2009, a decrease of 90 percent. During the same period, the number of fish tickets dropped by 68 percent.

Since 1981, the number of buyer/processors in Mendocino County has ranged from a low of 32 to a high of 75 (Figure 3-18). On average, 51 buyer/ processors or other distributors were operating in the area between 1981 and 2009 (PacFIN 2010). As of 2010, three on-site processors and six fish buyers were operating at Noyo Harbor.

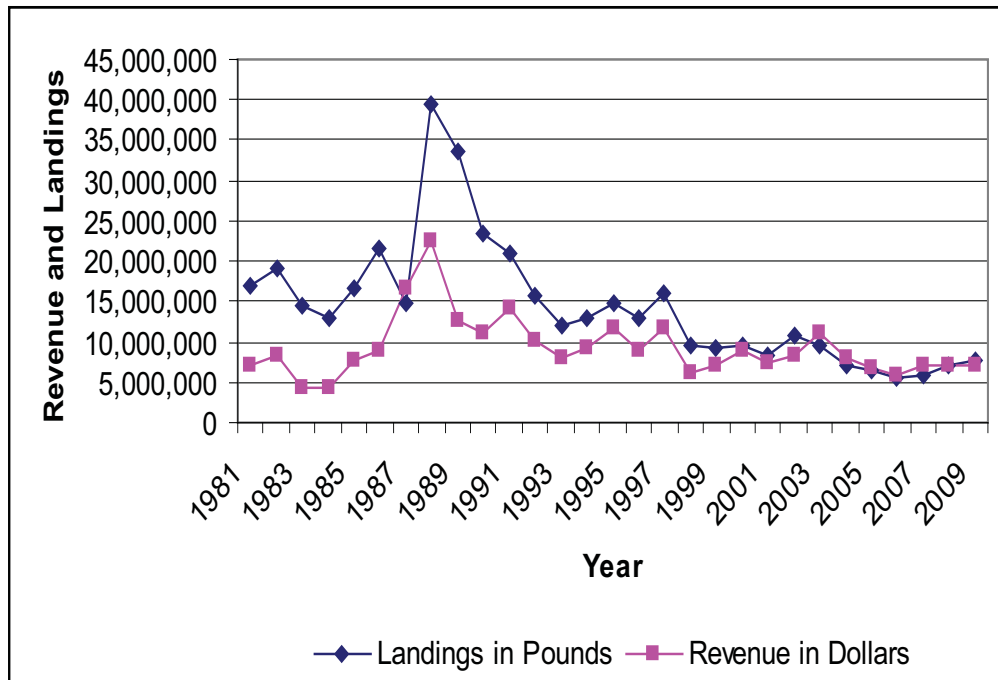


Figure 3-16 Landings vs. Revenue, Mendocino County: 1981-2009
Source: PacFIN 2010

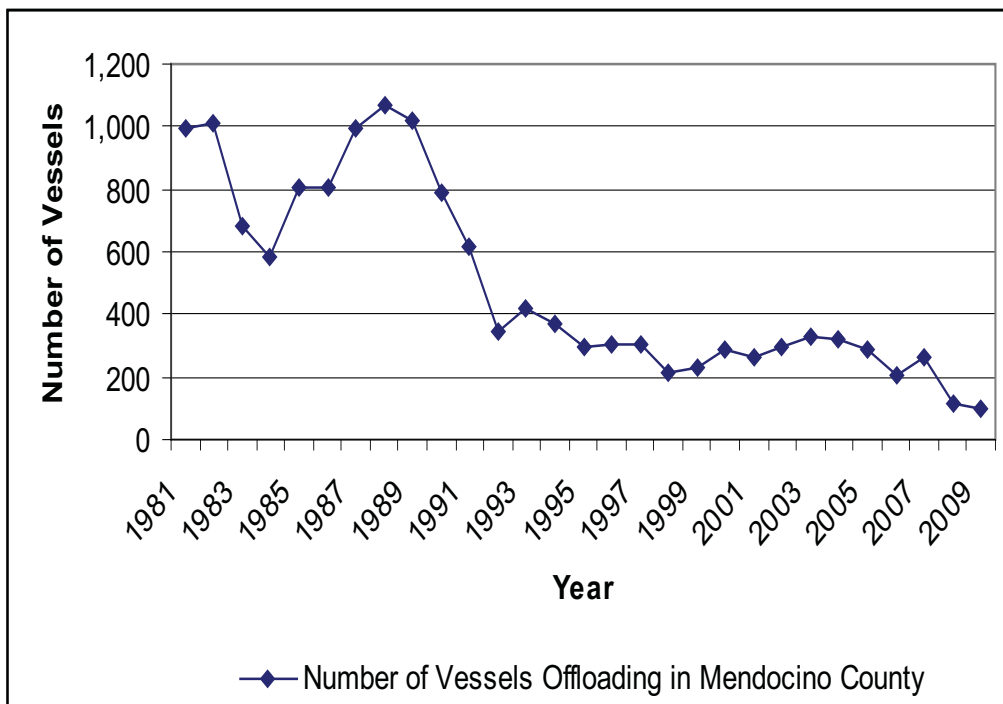


Figure 3-17 Commercial Fishing Vessels, Mendocino County: 1981-2009
Source: PacFIN 2010

In 2008, groundfish landings accounted for 53 percent of all ex-vessel revenue in the Fort Bragg/Noyo Harbor district (CDFG 2009a). Fishery participants and the marine-related businesses that support the fishing industries in Noyo/Fort Bragg reportedly have been significantly affected by the recent closures of the commercial and recreational salmon seasons.

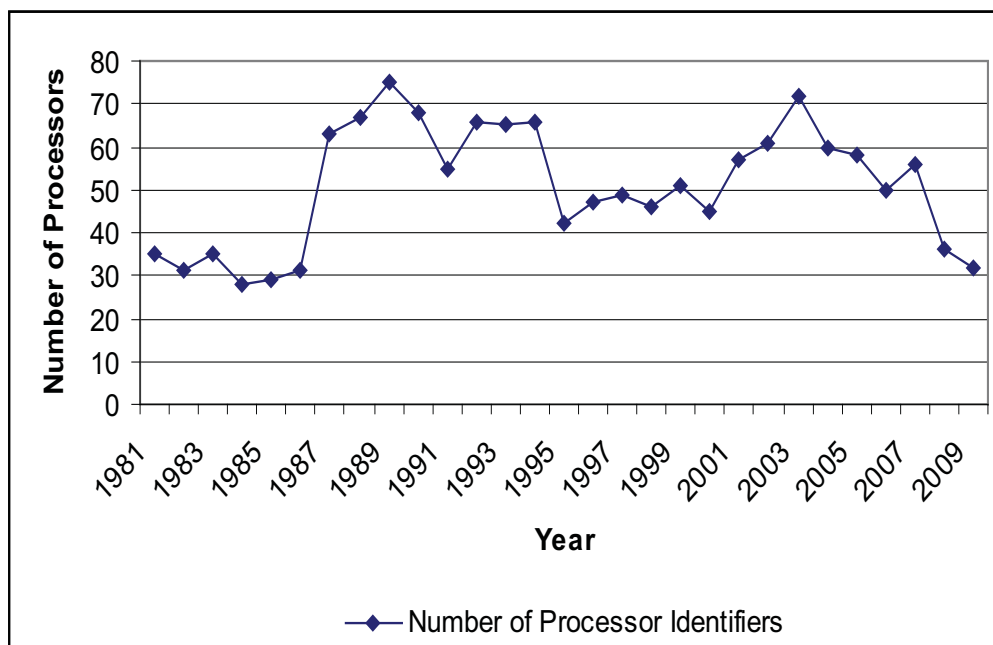


Figure 3-18 Number of Processors, Mendocino County: 1981-2009
Source: PacFIN 2010

Noyo Harbor/Fort Bragg. Noyo Harbor is the southernmost port in the North Coast region. The harbor is located along the Noyo River, just south of the City of Fort Bragg, about 88 miles south of Eureka. The Noyo Port District encompasses approximately ten square miles and is bordered by Pudding Creek on the north, Jughandle Creek on the south, and the Pacific Ocean. The harbor is the only major port between Bodega Bay and Eureka, a distance of ~300 miles.

The Noyo Port District owns approximately 300 acres of land and tideland properties (Winfield Smith Associates & Land Planning Research 1992). Funding for improvements and maintenance derives from slip, hoist, and pier fees and rental concessions (Pomeroy et al. 2010b).

Fishermen have been trolling for salmon in the naturally protected Noyo Bay since around the turn of the 20th century (Norman et al. 2007). During salmon season, hundreds of resident and non-resident fishing boats reportedly crowded the harbor and trolled in nearby waters. The trawl fishery flourished in the 1930s and 40s (LeBaron 1992), and peaked in the 1980s, with approximately 30 vessels. At least six large processors operated along the waterfront during the 1980s. Productivity diminished by 1990, for a variety of reasons. These included evolving groundfish regulations and other fishery management measures.

By the mid-1990s, 16 harvesters and three processors remained in the groundfish fishery. The 2003 federal trawl buyback program and, more recently, the statewide salmon closures further reduced the size of the fleet.

The Noyo Harbor mooring basin is currently operating at 68 percent capacity. Officials report that the structure of the fleet has changed from 90 percent commercial vessels and 10 percent recreational vessels in the 1970s, to 40 percent commercial vessels and 60 percent recreational vessels today. Recreational anglers target abalone, salmon, rockfish, lingcod, crab, and occasionally albacore tuna (Pomeroy et al. 2010b).

The Noyo Harbor inner basin was completed in the 1960s. The facility currently provides 238 slips, but can accommodate only shallow-draft vessels. Services include a privately owned ice plant, a privately owned fuel station, two boat ramps, a commercial fisherman's work dock with hoist, three marine supply stores, and a boatyard.

Table 3-17 Noyo Harbor User Groups, Infrastructure, and Services

User Groups	Harbor-Owned Infrastructure	Harbor Services	Resident Business Types
Commercial fishing Recreational fishing (charter, private boat and shore-based) Resident businesses Community residents Tourists	Docks/slips Inner Basin (238) Launch ramp (2) Parking lot Restrooms Fuel Dock (C. Renner Petroleum) Offloading Infrastructure - none Other Infrastructure - work dock/hoist - transient dock	Bilge Pump-Out Station Oil recycling station Bathrooms/showers Visitor berthing Dock power, water Waste disposal	Fish buyer (6) Fish Processor (3) Fish Market (2) Marine supplies (3) Bait/Tackle shops (2) Boat Building/Repair (2) Charter Operations (5) Restaurants (7) Ice Plant (1) Coast Guard Station (1) Fuel Dock (1) Dive Shops (2) Kayak Rentals (2)

Source: Pomeroy, C., C. Thomson and M. Stevens 2010b

A marina and RV Park is located on the river less than a mile upstream from Noyo Harbor. Recreational fishermen are the principal clientele. Marina facilities include 150 slips, a fuel dock, a fish cleaning station, and a tackle and bait shop.

Noyo Commercial Fisheries. The salmon troll, groundfish trawl, and crab fisheries have long been economic mainstays in the Fort Bragg/Noyo region. Today, the primary commercial fisheries at Noyo Harbor include Dungeness; red sea urchin; sablefish; trawl, hook-and-line, and trap for groundfish; and salmon troll. Other fisheries of lesser or past importance include the troll fishery for albacore tuna and the trawl fishery for ocean shrimp (Pomeroy et al. 2010b). The live fish fishery, primarily for rockfish, is also significant in economic terms.

Table 3-18 Ex-Vessel Value of the Top Five Species Landed at Noyo Harbor/Fort Bragg: 2000-2008

Species	Total Revenue (\$)	Total Landings in Pounds	Average Annual Revenue (\$)	Average Annual Landings in Pounds
Chinook Salmon	30,074,621	7,946,408	3,341,624	882,934
Sablefish	10,530,988	7,972,917	1,170,109	885,879
Dungeness Crab	9,211,464	4,782,627	1,023,496	531,403
Red Sea Urchin	7,472,620	11,176,629	830,291	1,241,847
Dover sole	5,057,849	13,503,470	561,983	1,500,385

Source: CDFG 2009a

In the 1970s, nearly 130 commercial captains and their crews based operations at Noyo Harbor. The majority trolled for salmon. As many as 500 boats used the harbor during peak salmon fishing seasons in peak years past (Winfield Smith & Associates and Land Planning Research 1992).

Prior to the statewide salmon season closure in 2008, approximately 80 captains used Noyo Harbor as homeport. The local fleet included some seven trawlers, 30 to 40 salmon trollers, 10 to 15 urchin dive boats, and 15 to 20 multi-fishery vessels (Pomeroy et al. 2010b). Informants now characterize the local fleet as more diversified, with the majority of active fishermen participating in multiple fisheries, most of which include crab. Sea urchin divers continue to focus primarily on that fishery. Today, about 76 full- and part-time captains are based at Noyo.

Captains of transient vessels also use Noyo Harbor facilities, especially during salmon season. Pomeroy et al. (2010b) report that many California commercial salmon fishermen use Noyo Harbor given more stringent harvest restrictions to the north. Moreover, the fishing grounds west of Noyo/Fort Bragg have historically been among the best for salmon. For many in the local fleet, the salmon season begins in the Pillar Point area in San Mateo County or the San Francisco Bay area and gradually moves north to Shelter Cove. A few captains and crew travel to fish in Alaska. During seasons of high abundance, all slips at Noyo are filled and some captains moor along the river.

Between 2000 and 2007, fishermen offloaded 8.1 million pounds of salmon at Noyo, accounting for 86 percent of the total 9.4 million pounds of salmon landed at all North Coast ports. The landings had an average annual ex-vessel value of \$3.8 million. Between 2000 and 2008, salmon landings at Noyo accounted for nearly 30 percent of the total ex-vessel value at the port.

Salmon season closures reportedly have had a significant effect on the local fleet. Some salmon fishermen have left the industry. Others have adapted to the closures by shifting into different fisheries or intensifying effort in the Dungeness fishery. Many fishermen report working second jobs in the finance, real estate, construction, or tourist industries, as opportunities allow.

Noyo Harbor is the only North Coast port where significant volumes of red sea urchin are landed. The fishery involves use of scuba gear. The urchin fishery peaked in this area during the mid- to late-1980s, with divers traveling from as far south as San Diego. During years of high abundance, and depending on international market demand, this fishery can be quite lucrative. In 2002, 2.2 million pounds of red sea urchin was landed at Noyo Harbor, with an ex-vessel value of \$1.8 million dollars. Japanese buyers in San Francisco and Eureka constitute

much of the local market for urchin. Area processors report a growing demand for urchin. In 2007 and 2008, approximately 10 to 15 Noyo-based divers participated in the fishery (Pomeroy et al. 2010b). Today, about 40 participants are active across Mendocino County.

The sablefish (blackcod) fishery is also a high-value fishery, due in large part to demand from Asia. Between 2000 and 2008, an annual average of 886,000 pounds of sablefish, with an average ex-vessel value of \$1.2 million, was offloaded at Noyo Harbor. Most of the sablefish captains in the area possess open-access permits. Some are also licensed to participate in the live fish fishery, primarily for nearshore rockfish. Much of the live product is trucked to San Francisco.

Currently, three on-site seafood processors are based at Noyo Harbor. One processes groundfish, crab, and salmon; two process urchin. Five seafood buyers (including the three processors) operate permanent receiving stations at the harbor. Each is equipped with a hoist and associated offloading facilities. Buyers from Eureka, San Francisco, Sacramento, and Santa Rosa purchase seafood from local fishermen and processors. A small number of local fishermen sell their catch directly to the public and/or local retail seafood markets.

The ocean floor along the Mendocino coast is marginally conducive to crab production. The primary crabbing grounds in the Noyo area are from the nearshore zone to about 40 fathoms; due to the bathymetry of the area, there is limited space for setting strings of pots.

Currently, an estimated 30 crabbers participate in the Noyo-based Dungeness fishery. Key discussants report that many crabbers entered the fleet as opportunities for success in other fisheries have diminished. Many of the new entrants own smaller vessels, originally used for salmon trolling but now adapted to carry pots.

Vessels range from 24 feet to 63 feet in length, but the majority are less than about 48 feet in length overall. Approximately ten of the vessels are more than 48 feet in length. Captains of the small- and mid-sized vessels fish predominantly in local waters. The small, crab pot-laden vessels are limited in their capacity to travel north to Cape Mendocino during the often stormy winter months. While some small-vessel captains will occasionally trailer their boats to Eureka to fish, they more typically set in the waters between Punta Gorda and Point Arena, often making numerous trips to and from the harbor to carry and set gear.

The majority of Dungeness crab landed at Noyo is captured between Point Arena and Punta Gorda, with as much as 50 percent harvested from Usal. Located near a deepwater canyon, the Usal area is the most extensive offshore crabbing ground between Punta Gorda and Noyo Harbor. Fishermen are capable of setting gear as far out as 70 fathoms at Usal, a rarity along this coast. The grounds off Manchester Beach produce crabs inside of 40 fathoms. However, the quality and quantity of the harvest in this area is reportedly inconsistent. Some respondents crab at Ten Mile Beach, as it is sandy, has an estuary, and few rocks. However, it has been asserted that recreational crabbers tend to “pick over” this area prior to commercial opening.

Captains with large vessels often travel to waters north of Punta Gorda. A few large-boat captains hold Oregon, Washington, and California permits. The large crab vessels in the Noyo

fleet are able to withstand the often heavy seas around Cape Mendocino, and can carry more gear, minimizing trips and expenses. Fishermen discuss differences in bottom conditions north of Cape Mendocino and south of Punta Gorda, highlighting the expanse of level, sandy floor reaching out beyond state waters, and the fertile waters along the mouth of the Eel River north of Cape Mendocino. Such vessels also fish south of Point Arena in District 10 and north to the Oregon Border.

Weather and winds play an important role in the crab fishery, as they influence decisions about when and where to lay gear. In spring and summer, the Mendocino Coast often receives onshore winds from the northwest. While these conditions can be challenging, they are said to be more conducive than the winter southerly or southwest winds, which, according to one informant, “are the most feared.” During northwest winds, a boat can run up north and set in the bights more securely, as the “pockets” of lee conditions are more predictable. While many anchorages along the Mendocino coast provide shelter from northwest winds, most are open to the southerlies. Moreover, during a southerly storm or swell, the bars around the Noyo Harbor mouth tend to migrate, rendering harbor entry a perilous undertaking. Should a fisherman get caught outside during a storm, he must seek safe anchorage to the north, most commonly at the Usal bight. Captains try to avoid south winds and, as such, lose many otherwise good fishing days.

Fishermen use razor clams, squid, or herring to bait the pots. Ideally, the boat is maintained on a straight course into the wind as the pots are pushed over one at a time. Thirty to 60 pots line a string and depending on the size of his vessel, a captain might lay several strings, often parallel to the shoreline or bathymetric feature. Many factors render the work dangerous: the weight of the traps on the lines amidst constant use of hands and fingers; confused or threatening sea and swell conditions; the force of wind and currents; gear-propeller entanglement and loss of power; navigating and working in close proximity to shoals, rocks, and breaking seas, among others. During winter storms, pots can part the line, wash ashore or get buried in the sand and/or mud – with associated replacement costs.

Two on-site buyers purchase the majority of crab offloaded at Noyo. Some fishermen prefer to sell to small-volume buyers from the San Francisco Bay area. Fishermen working in waters north of Punta Gorda primarily offload at Humboldt Bay or Crescent City, reserving some crab for buyers in Noyo to whom they are loyal.

With no salmon season to supplement their income, some fishermen are extending participation in the crab fishery. In the past, most crabbers working from Noyo completed their season by late January or early February. Working the crab season for three months or less was once enough to cover overhead expenses and still make money. Now, many in the small- and mid-size fleet continue to fish through to the season’s close in mid-July. Late season crab often fetches as much as \$4.50 per pound in the San Francisco Bay area. Here, small vessel skippers can often make up for a poor season or offset the loss of another fishery. Between 2000 and 2008, an average of 532,000 pounds of Dungeness crab, with an average ex-vessel value of \$1 million, was landed at Noyo Harbor. Crab landings at Noyo accounted for 15 percent of fishery-specific revenue at the harbor for that period (Figure 3-19).

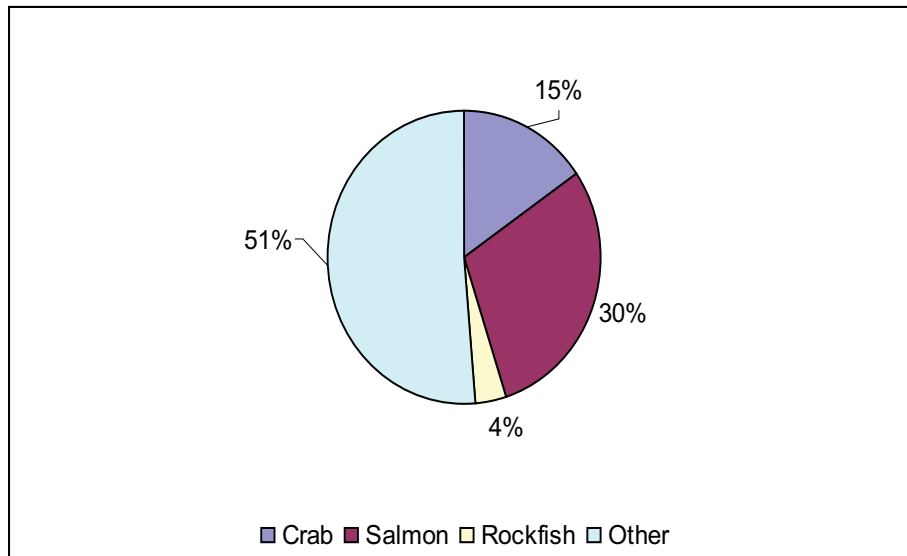


Figure 3-19 Percentage Value of Noyo Harbor Landings: 2000-2008

Source: CDFG 2009a

Historically, salmon was the mainstay fishery at Noyo Harbor. One fisherman discussed the fact that California once issued over 4,000 commercial salmon permits; now approximately 600 permits are issued, with only about 300 active, and only a fraction of these at Noyo. Traditionally, the fishery was sufficient to sustain a fisherman throughout the year, and many were able to make enough money to get through the winter. With the recent salmon closures, fishermen gradually began diversifying into other fisheries, including tuna, crab, and sablefish. They also became more dependent on the winter crab fishery. Currently, 35 skippers participate in the salmon fishery conducted from Noyo Harbor.

Commercial vessels here tend to range from 24 feet to 63 feet in length. Most are small- or mid-sized vessels used predominantly in local waters. Three or four boats are large enough to travel north of Punta Gorda. A portion of captains with large vessels hold Oregon, Washington, and/or Alaska permits, as well as California permits.

When the season is open, captains with vessels larger than 35 feet in length follow the migrating salmon for great distances. Some captains will travel to Half Moon Bay and the San Francisco Bay for the salmon opener, and then head north to the Noyo/Fort Bragg area. Captains of smaller vessels tend to remain in the local area. Favored salmon grounds include waters around Tolo Banks, from Buck Creek south to Rockport. The waters from Usal south to Rockport are particular favorites; all grounds are roughly in 30 fathoms of water. These areas are also important as they serve as anchorage sites in extreme winds and seas.

In response to recent statewide closures, some salmon fishermen began concentrating on the albacore fishery, traveling as far north as Oregon. However, albacore is a challenging fishery, with vessels running as far as 100 miles offshore. The most efficient albacore vessels use a refrigeration system, which makes the vessel heavier and increases costs. If a fisherman is running an “ice trip” for albacore, he has only four days to fish before returning to harbor to offload. Many fishermen say they tend to break even on such trips. Other fishermen have opted

into the open-access sablefish fishery, though strict quotas are said to constrain profits. A number of salmon fishermen have shifted into the crab and rockfish fisheries. Yet others have not been able to diversify and have left the salmon fishery all together.

The narrow strip of rocky reef and rich kelp growth along the Mendocino coastline supports a vibrant rockfish habitat. The health of the rockfish fishery is dependent on intense upwelling in the spring and summer months. A large number of species of rockfish are found in this part of the Mendocino coastline, including blue, black, olive, squarespot, vermilion, chilipepper, cowcod, gopher, yelloweye, and canary.

About six local fishermen currently participate in the nearshore and deeper nearshore rockfish fisheries out of Noyo Harbor. Vessels range in size from 16 feet to 24 feet in length. Between 2000 and 2008, commercial rockfish landings at Noyo accounted for nearly four percent of the fishery-specific revenue at the harbor for that period.

Historically, the rockfish fleet at Noyo Harbor was considerably larger, with as many as 30 participants. Reportedly, several regulations affected the size of the fleet, beginning in the 1980s. In particular, respondents point to the state's effort reduction program, which ultimately reduced the fleet by as much as 70 percent. RCAs further limited the fishery spatially, while the reduction of the fishery to a ten month season limited the fishery temporally.

Noyo-based fishermen will travel as far south as Albion Harbor and as far north as Shelter Cove. Respondents say they will work a variety of grounds to relieve pressure on any one given area. The small size of vessels generally limits effort during the winter months. Some fishermen work along the Mendocino Headlands during the winter months due to the proximity of those grounds to the harbor. In spring and summer, important nearshore grounds include those south of Cape Vizcaino and the sheltered coves around Van Damme State Park.

Nearshore fishermen primarily use hook-and-line gear, trap, and, vertical longlines outside one mile. Fishermen may carry live-wells on their vessels, delivering their product live through trucking arrangements to markets in the San Francisco area. At least one local fisherman sells his product directly to the live market in the Bay area.

Lingcod and kelp greenlings are important nearshore species. Generally caught in ten to 15 feet of water, lingcod is often taken around Mendocino, offshore Cleone. Fishermen will travel as far north as Shelter Cove during the calmer summer months when nearshore waters settle.

By necessity, many nearshore fishermen also engage in other fisheries, including crab, salmon, sablefish, and urchin. Some also have second jobs as dive guides for the recreational abalone fishery. One rockfish fisherman stated that "every fishery counts . . . most [rockfish] fishermen are on a thin edge . . . it all adds up to a living - if you lose one part, you can lose the entirety."

The local urchin fleet consists of roughly 10 vessels and 20 divers. Vessels range from 22 feet to 34 feet in length. A portion of the fleet will work from other California ports, including Oxnard, Santa Barbara, Bodega Bay, and Point Arena, depending on market factors and the changing distribution or density of kelp and urchins. During the summer, most diving occurs inshore.

During the winter, divers move further offshore, well out of range of breaking swells. Divers may employ a tender to watch the boat while diving. This is particularly critical in rough weather or sea conditions. Urchin divers will work an average of 100 days per year, offloading at Noyo, Albion, and/or Point Arena, depending on proximity to the grounds. Urchin offloaded at Albion and Point Arena, and even Bodega Bay, is trucked to Noyo for processing.

A large portion of the red sea urchin harvest is collected just north of Point Arena and south of Punta Gorda. From Noyo Harbor, a diver will typically work the areas from Cape Vizcaino south to Elk. The area south of Noyo Harbor to Elk is particularly favorable for diving, as nearly all of this section of coast, with the exception of the beach areas inside of the coves, is relatively productive.

Urchin harvest areas vary seasonally. Wind patterns, water visibility, fluctuations in market prices, and obviously density and distribution of urchins are among the important variables factored into decisions that determine where a captain will collect urchins. For instance, because the Westport and Elk regions are known for good water quality and thus high visibility during the spring and summer months, and because these areas are protected from northwest winds, extensive urchin harvest occurs in these areas.

The quality of urchin can vary by location. Stewart's Point reportedly produced high quality urchins, but is now a North Central Coast MPA and closed to harvesting. In contrast, the area from Point Arena Lighthouse to Saunder's Reef reportedly produces lower quality urchin, in part due to wind exposure. This latter area, however, has been a high production area. One distributor reports that lesser quality urchin tends to be exported to Japan, whereas higher quality urchin tends to be sold domestically.

Proximity to harbor is also important as it reduces overhead and ensures prompt delivery of live product to the processors. After the processor removes, rinses, and cleans the roe and prepares it for delivery, it will typically be received within 48 hours of being offloaded.

Nearly all divers who work from Point Arena, Albion, and Noyo Harbor sell to two Noyo-based urchin processors. One processor sells much of his product to the Japanese market, depending on the strength of the yen. Another asserts that demand peaks between November and February, with particularly high demand in December and January, months that correspond with the Japanese holiday season. A few urchin divers also participate in the live rockfish fishery. Limited entry programs and small vessel size constrain movement into other fisheries.

Noyo Recreational Fisheries. Recreational fishing has long contributed to the Noyo/Fort Bragg economy. Noyo Harbor provides the only launching point for boats between Shelter Cove and Albion Harbor. Hundreds of visitors from inland areas, including the Sacramento and San Joaquin Valleys, come to Noyo each summer to dive for abalone. Visiting anglers patronize hotels, campgrounds, restaurants, and grocery stores. Local business owners report extensive reliance on the patronage of summer visitors. One bait and tackle shop owner in Noyo estimates that 65 percent of his total annual earnings derives from summer visitors. His client base spans from Chico to Merced and Tahoe to Ukiah. Many recreational fishermen come to Noyo in December to target crab.

Recreational anglers fish from shore, private boat, kayak, and charter vessels. Salmon, rockfish, lingcod, abalone, crab, halibut, surfperch, and squid are particularly important. Spear divers and abalone fishermen often use kayaks.

Despite the rocky nature of the Mendocino coastline, shore-based angling is popular with residents and tourists alike. Shoreline anglers primarily target lingcod, cabezon, and rockfish along the Mendocino Headlands, Westport, or Todd's Point where both parking and shoreline access are most convenient. Shore-gatherers collect mussels and abalone during low tide along the rocky intertidal zone.

Private boat operators normally target rockfish, crab, and salmon. The majority of recreational vessel captains leaving from Noyo Harbor use small skiffs. Travel distances depend on weather and wave conditions, but most anglers remain within about ten miles north or south of the harbor.

Anglers land many nearshore species of groundfish at Noyo Harbor. Rockfish are caught with hook-and-line or by spear from the nearshore zone to no more than about 100 feet in depth. Cabezon and kelp greenlings reportedly are typically caught in waters of 25 feet or less. Once a year-round fishery, the state recreational rockfish season in this region presently runs from mid-May to mid-August.

The recreational crab fishery is most active late November through December. Crabs are typically captured in the Ten Mile River Beach area. Some people catch crabs from local docks.

Until recently, salmon has been the primary species targeted by recreational anglers. The number of recreational fishermen traveling to fish from Noyo declined following the suspension of the 2008 and 2009 salmon seasons. The primary recreational marina in Noyo has typically operated at 100 percent capacity, with recreational fishermen occupying 80 percent of its 150 slips. In 2008 and 2009, the number of recreational vessels mooring here dropped by more than half. The decline is attributed largely to the closure of the salmon fishery, but also to recent regulatory changes in the rockfish fishery. Many fishermen are concerned about the future of the salmon fishery along the North Coast.

Divers consider conditions in Mendocino County to be among the most favorable along the North Coast. The recreational abalone fishery has been popular in the Noyo/Fort Bragg area for nearly century. The fishery continues to attract hundreds of resident and non-resident divers from California and neighboring states. The most popular and productive abalone diving spots are located between Fort Bragg and Point Arena

Several coves surrounding the Noyo/Fort Bragg area provide shore-based abalone divers with protected points of entry. Coves at Mendocino Headlands State Park, Caspar Bay, and Russian River Gulch are particularly popular with divers without a vessel. Other popular diving areas in Mendocino County are Van Damme State Park, Albion Harbor, and MacKerricher State Park.

4Table 3-19 Abalone Diving Grounds in Study Counties and Six-Year Catch Figures: 2002- 2007

Location	Number of Abalone, Average*
Del Norte County	
Crescent City	70
Other Del Norte	29
Humboldt County	
Patricks Pt	547
Trinidad	288
Punta Gorda	1,062
Shelter Cove	3,850
Other Humboldt	957
Mendocino County	
Bear Harbor	508
Usal	261
Hardy Creek	1,455
Abalone Point	3,037
Westport	1,979
Kibesillah	1,537
MacKerricher State Park	4,536
Glass Beach	4,456
Todd Point	7,998
Georgia Pacific	6,335
Hare Creek	4,261
Mitchell Creek	1,259
Jug Handle State Reserve	6,010
Caspar Headlands State Beach/Cove	7,078
Jack Peters Gulch	3,394
Russian Gulch State Park	6,777
Mendocino Headlands State Park	9,985
Gordon Lane	2,796
Van Damme State Park	15,092
Dark Gulch	3,310
Albion Cove	10,641
Salmon Creek	1,216
Navarro River	3,744
Elk	8,064
North Coast 6-Year Average	3,952

* Estimated sport abalone catch from report cards. Source: CDFG, Personal Communication

Two dive shops supply enthusiasts in the Noyo/Fort Bragg area. These establishments, along with local hotels and campgrounds, derive much of their business from visiting abalone divers. Local business owners point out that, in the past, tourists came to fish for both salmon and abalone during the course of the summer, with effort evenly distributed between the two species. When the salmon season was closed in 2008 and 2009, many recreational fishermen reportedly pursued abalone on a more avid basis.

Charter operations have been active in the Noyo/Fort Bragg area since the 1960s. During the charter excursion heyday, as many as 12 charter vessels operated from Noyo Harbor. Charter

captains typically operated year-round, targeting a variety of seasonally available species. Captains typically offered: rockfish/crab trips between December and February; salmon/crab or rockfish/crab in March and April; “salmon-only” trips were typically offered in the late spring and early summer; and captains could sometimes offer albacore tuna trips in August. By the early 2000s, however, the number of charter operations had dropped by half. Today, five charter boat operations remain active, although some describe business as suffering in the absence of salmon seasons. To offset the loss of salmon fishing, most charter captains now offer crab fishing trips in the winter months and rockfish fishing trips during the spring. Albacore tuna is pursued during seasons when the species are close to shore.

Customary fishing grounds for Noyo-based charter operations extend approximately ten miles north and south of the harbor, and about one hour from shore. Historically, the grounds have been productive for rockfish and salmon, with the northern grounds also productive for crab. Charter captains occasionally make runs as far north as Punta Gorda –a three hour trip from Noyo– but, this requires due attention to fuel costs and to weather and sea conditions that can compromise safety on the long trip.

Some charter captains say that, given the current nature of rockfish regulations and recent salmon season closures, it is preferable to take clients to grounds north of the harbor where crab is abundant. Others are trying to interest their clients in species such as Humboldt squid. Most skippers now also offer whale-watching trips. During winter months, some captains cooperate to keep busy, recommending each other to clients seeking different experiences on the ocean.

Unlike other port communities where tourism has superseded commercial fishing as a major source of revenue, tourism activities remain relatively limited in Noyo. This is due in part to the distance of Noyo from large population centers.

Currently, the mooring basin at Noyo is only 68 percent occupied. The change in the numbers of vessels delivering seafood to and mooring at Noyo Harbor between 1981 and 2010 can be attributed primarily to the substantial decline in the salmon fishery, which in turn relates in part to implementation of the statewide limited entry program for salmon in the early 1980s, reduced fishing opportunities following the re-allocation among tribal and non-tribal fishery sectors in the early 1990s, and the recent closures (Pomeroy et al. 2010b).

The significantly diminished size of the commercial and recreational fleets at Noyo has impacted the Harbor District revenue stream. The majority of harbor funding comes from moorage fees, parking fees, property taxes, and other sources. The decline of the once dominant logging industry in this region, including the 2002 closure of a regionally important lumber mill, has also resulted in the loss of hundreds of jobs and associated tax revenue.

Albion. Albion is located equidistant between Fort Bragg and Point Arena. Albion Harbor is used by both commercial and recreational fishermen. Visitors frequently stay at one of two small campgrounds adjacent to the harbor. The harbor facilities are maintained through fees garnered for docking, offloading, camping, day use, launching, and rentals of kayaks, canoes, cottages, and trailers. Facilities include dock space, a launch ramp, and camping sites. There are no charter services in Albion.

Like many coastal communities in Northern California, Albion was first established as a timber town. The first sawmill was established in 1852, and a railroad line and shipping wharf soon followed (Scofield 1954). Fishermen began to troll for salmon in the river lagoon during the late-1800s. From the 1920s through the 1950s, fishermen would sell their catch to buyers who would transport the product to Noyo Harbor for processing and/or further distribution (Scofield 1954). In 1965, a local entrepreneur established a campground for recreational anglers, with fishing docks, moorings, and a small restaurant (Tahja 2008). The campground continues to serve as a base for most recreational anglers visiting the Albion area today.

Harbor infrastructure at Albion includes a commercial dock with 18 slips, a recreational dock with space for nearly 30 vessels, an offloading area and receiving station, a hoist, two launch ramps for small vessels, and storage spaces for boats and RVs. There is also mooring space in the bay. Ice and bait are sold at the campground. Fuel is available in town. Campground facilities include tent and RV sites, trailer and cottage rentals, day use areas, shower and bathroom facilities, a general store, and a café that is open during fishing season.

Table 3-20 Albion User Groups: Infrastructure and Services

Location	Primary Facilities	Owner/Operator(s)	Services	User Groups†
Albion	Campground Marina	Privately Owned and Operated	Launch Ramps	R, T, AR
			Dock	C, R
			Offloading Dock/Receiving Station	C
			Hoist and fork lift	C, R
			Fish cleaning station	R
			Camp store	R, T
			Albion Café	R, T, AR
			Tent/RV sites	R, T
			Kayak rental	T

†C = Commercial fishermen; R= Recreational Fishermen; T =non-consumptive orientated tourist; AR= area resident
Source: IAI 2010

Albion Commercial Fisheries. The primary commercial fisheries conducted from Albion are sea urchin, rockfish, salmon, cabezon, and greenling. Four to six divers participate in the sea urchin fishery, and two fishermen currently participate in the nearshore hook-and-line rockfish fishery. As many as thirteen local fishermen trolled for salmon from Albion Harbor in 2006.

Table 3-21 Ex-Vessel Value of the Top Five Species Landed at Albion Harbor: 2000-2008

Species	Total Revenue (\$)	Total Landings in Pounds	Average Annual Revenue (\$)	Average Annual Landings in Pounds
Red Sea Urchin	2,590,067	3,688,132	287,785	409,792
Rockfish, various	110,977	32,161	12,330	3,573
Cabezon	57,547	17,847	6,394	1,983
Chinook Salmon	30,673	9,617	3,408	1,068
Kelp Greenling	23,281	5,610	2,587	623

Source: CDFG 2009a

Currently, two buyers with receiving stations seasonally purchase seafood at the offloading dock. One buys sea urchin and trucks it to Fort Bragg for processing. The other specializes in live seafood products, and transports his purchases to San Francisco. There are no retail seafood

establishments in Albion. A small number of fishermen sell lingcod directly to the campground café.

Dungeness crab is not a highly significant commercial fishery at Albion. Between 2000 and 2008, crab landings at Albion accounted for less than one percent of all fishery-specific revenue at the harbor for that period. Red sea urchin is the principal commercial fishery at this port of landing, accounting for 74 percent of all fishery-specific revenue at the harbor between 2000 and 2008.

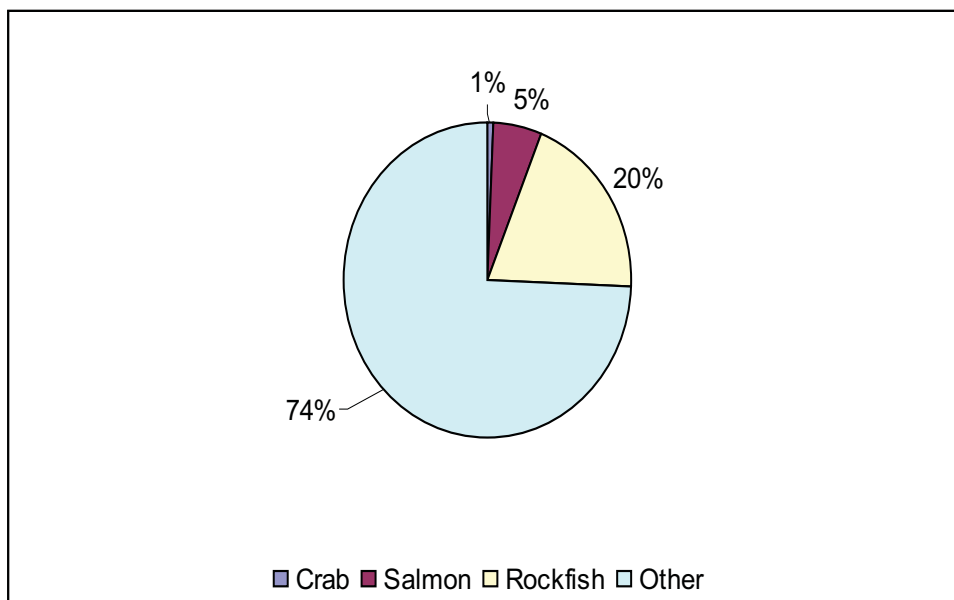


Figure 3-20 Percentage Value of Albion Harbor landings: 2000-2008

Source: CDFG 2009a

Three fishermen currently participate in the Albion-area salmon fishery. Vessels average 24 feet in length. Prior to the salmon season closures in 2008 and 2009, as many as 15 resident fishermen and 20 non-resident commercial fishermen targeted salmon during the spring and summer months. The resident salmon fleet currently works the waters between Elk and Mendocino Headlands, as regulations permit. Grounds may extend as far north as Point Cabrillo and as far south as Manchester Beach, in waters from 20 to 60 fathoms deep.

Albion-based salmon fishermen offload at Albion and Noyo. From Albion, the product may be trucked to one of two main buyers in the area. Non-resident buyers occasionally come to Albion.

Fishermen who once primarily targeted salmon are moving into fisheries such as the urchin, crab, and even kelp herring roe. Urchin is the primary fishery in Albion.

No more than three fishermen currently participate in the Albion-based nearshore rockfish fishery. As their vessels are 24 feet in length, the fishermen generally stay close to harbor, ranging from Alder Creek to Fort Bragg, with a particular focus on the waters between Elk and Mendocino Headlands. The fishermen primarily use hook-and-line and Portuguese longline for rockfish. Species targeted include blue, black, olive, squarespot, vermilion, chilipepper, cowcod,

gopher, yelloweye, and canary rockfish. The fishermen also target lingcod. Live fish is sold to buyers for distribution on the live market in the San Francisco area

The nearshore rockfish fishery is open on weekdays and non-holidays between May and February. But quotas on certain species ultimately minimize the number of allowable fishing days. As such, many fishermen participate in other fisheries, most notably urchin. Commercial rockfish landings at Albion accounted for nearly 20 percent of fishery-specific revenue at the harbor between 2000 and 2008.

The Albion-based red sea urchin fleet consists of about six captains and eight urchin divers. Vessels average 24-feet in length. The urchin fleet here benefits from proximity to productive grounds. Most divers are full-timers who depend solely on the urchin fishery for their livelihood.

Divers collect urchins using their hands and/or an urchin rake. Typical depth is between 30 and 40 feet, but some will dive to 80 feet, in which case less time can be spent underwater. Divers typically dive according to two strategies, harvesting either for quantity or for quality. While harvesting for quality renders fewer urchins, the value per urchin may be greater. Divers interested in the quality of urchin roe may check the urchin by carefully cracking it underwater before collection.

Sea and wind patterns, water visibility, proximity to port, and seasonal fluctuations in the marketplace are important variables in determining a prospective harvest area. For instance, visibility in the Elk region tends to be better in the spring and summer. Cuffy Cove and Van Damme State Beach are protected from northwest winds. The area north of Albion Harbor is also favored by divers who like to selectively pick their urchins.

The Albion urchin fleet offloads at the harbor. The product is then transported to distant markets by the two local processors. Divers from Point Arena who work the Albion area from Elk to Point Cabrillo also may offload product at Albion, if tide and swell are conducive.

Albion Recreational Fisheries. Albion Harbor is the sole launch point between Noyo Harbor and Point Arena. There are three public launch ramps and two nearby campgrounds. As noted above, Albion Harbor has been a popular destination for recreational fishermen since the mid-1960s. Reportedly, 90 percent of visiting recreational fishermen comes from inland areas and adjacent counties; an estimated 20 percent come from Nevada. Private boat is the most popular mode of fishing here, and kayak fishing is increasingly popular. Most anglers trailer their boats to the area and stay at local motels or campgrounds. A local restaurant and a grocery store depend in large part on the patronage of summer visitors.

The seasonal round of recreational fishing-related business for Albion Harbor and its campgrounds begins in April, when visitors come for abalone. During the 2010 Memorial Day weekend, 96 of the 109 campsites at the Albion campground were occupied. A harbor official estimates that 50 percent of campers targeted abalone. Campground attendance peaks between Memorial Day and Labor Day, when regulations permit fishermen to target salmon, rockfish,

crab, and abalone. During the summer months, campgrounds tend to run at full capacity and use of the boat launch and other camp amenities doubles. The next peak in recreational activity occurs in late November, when visitors come for the end of abalone season and the beginning of crab season.

Much of the Albion coastline is rocky and not conducive to shore-based angling. Anglers in this part of the county cast from the Albion Headlands or the Mendocino Headlands. Lingcod, rockfish, and cabezon are popular recreational targets. People also gather abalone and mussels during low tide along the shore near Albion Harbor. One respondent contends that shore-based fishing opportunities have been declining for the past three decades in the Albion area. He attributes the decline to shoreline development and increasingly limited public beach access.

Recreational fishermen harvest a wide variety of seafood from Albion Harbor. The primary recreational ocean fisheries are salmon troll, rockfish hook-and-line, and crab trap and hoop. Occasionally, hook-and-line fishermen will target California halibut and Pacific halibut. When regulations permit, Chinook salmon is the most popularly targeted species. Salmon fishing grounds are located just outside the harbor up to 60 fathoms, and from the Navarro River to the Mendocino Headlands. Fishermen also target lingcod, greenling, and blue, black, and vermilion rockfish between Van Damme State Beach and Elk. Most private boat anglers stay north of the Navarro Headlands, up to depths of about 20 fathoms.

Abalone is one of the most important recreational fisheries in Albion. Albion Harbor abuts a protected bay where divers can safely pick abalone many days of the year. Van Damme State Park, located just north of Albion, also offers divers excellent protection from winds and rough sea conditions. Indeed, it is one of the most protected and easily accessed harbors along the Mendocino coastline. There are numerous rock gardens, kelp beds, and small inlets here.

Small communities located in the vicinity of Albion Harbor are reportedly dependent on the business directly and indirectly generated by the recreational abalone fishery. Elk, Mendocino, and Caspar all provide hotels, motels, campgrounds and vacation rental properties for the large number of abalone divers who visit the coast each summer. Local restaurants and grocery stores also benefit from seasonal population growth associated with the abalone fishery.

Historically, salmon has been a major fishery for Albion-area fishermen. Local business owners note how the recent salmon closures have negatively affected sales. Campground employees estimate business decreased by 40 to 50 percent in 2008 and 2009. In response to the closures, one campground manager cut overhead by reducing summer staff and offering limited café service.

Key informants report that establishment of increasingly restrictive recreational rockfish regulations involving depth restrictions, reduced seasons, and bag limits have detrimentally affected local businesses. More recently, the national economic downturn has impacted the recreational fishing industry and associated businesses in Albion.

Del Norte County. Crescent City Harbor is the sole port of landing in Del Norte County. Between 1981 and 2009, total reported landings averaged 21 million pounds per year; total ex-vessel revenues averaged \$13 million. Landings peaked in 1992 at 39 million pounds, with an ex-vessel value of \$17 million. Following that peak, landings fluctuated but decreased markedly overall. In 2009, 137 fishing operations offloaded a total of 16 million pounds of seafood, with an ex-vessel value of \$17 million (PacFIN 2010).

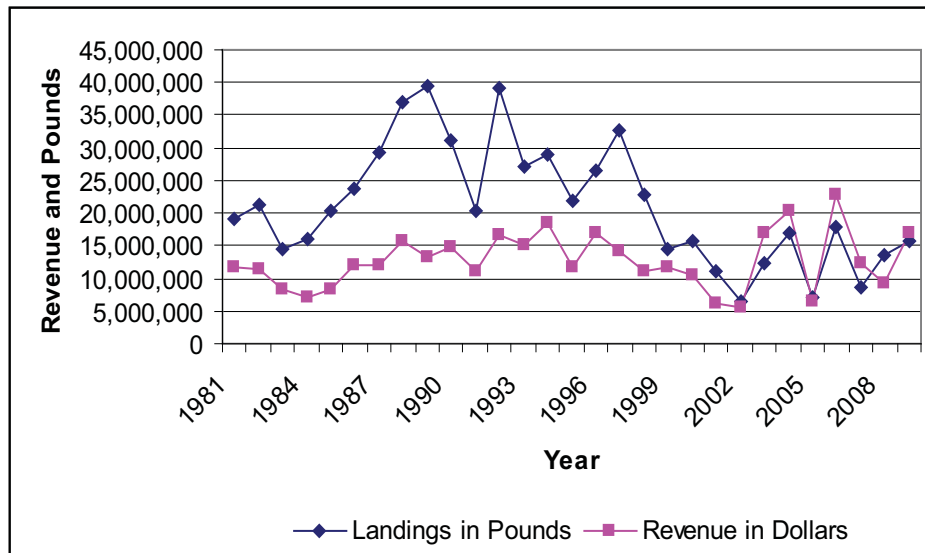


Figure 3-21 Landings vs. Revenue, Del Norte County: 1981-2009
Source: PacFIN 2010

The number of commercial fishing vessels landing in Del Norte County peaked at nearly 2,000 in 1981. On average, 352 captains offloaded at Crescent City between 1981 and 2009. The number of fish tickets submitted also decreased during the period, dropping from 15,786 tickets in 1981 to 3,061 in 2009, an 80 percent decrease. Only 137 commercial captains were operating in 2009.

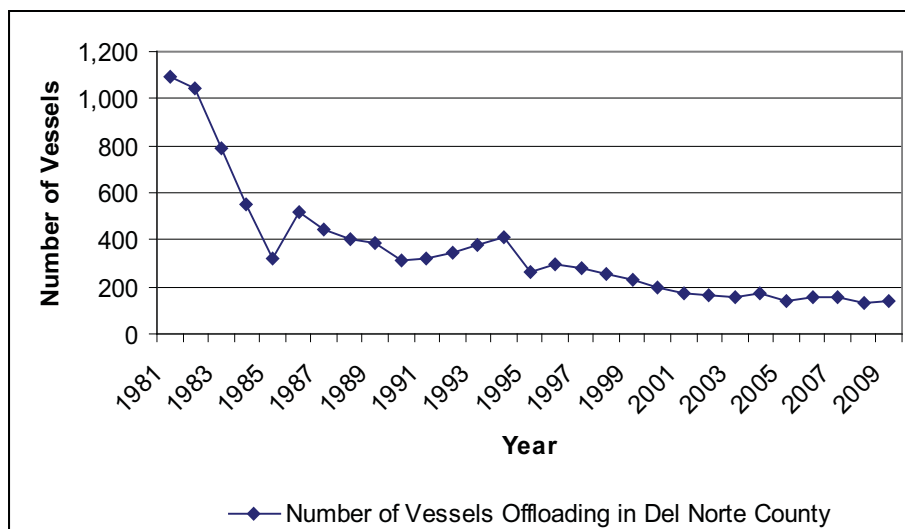


Figure 3-22 Commercial Fishing Vessels, Del Norte County: 1981-2009
Source: PacFIN 2010

Since 1981, the number of processors in Del Norte County has ranged from a low of 21 to a high of 50. On average, 35 seafood buyers were operating in Crescent City between 1981 and 2009 (PacFIN 2010). In 2010, processing operations at Crescent City Harbor included one on-site and approximately five off-site buyer/processors (Pomeroy et al. 2009a).

Crescent City. Crescent City is the sole commercial harbor in Del Norte County, and the northernmost port in the State of California. It has also long been one of the state's most prolific ports of landing for commercial and recreational crab, salmon, groundfish, and ocean shrimp (Pomeroy et al. 2009a). Sole, lingcod, rockfish, flounder, whitebait, smelt, albacore, sablefish, surf perch, shark, and halibut have also been historically important (Scofield 1954). Despite facing several challenges in recent years - including fluctuations in the abundance of certain species, increasingly restrictive groundfish regulations, and a diminished fleet - the fleets, harbor, and support industries continue to contribute to the local economy in a significant way.

The harbor was first established as a point of transshipment for goods needed by the miners and other settlers who began arriving in the mid-1850s. As the Gold Rush tapered off, residents began to pursue the region's marine and timber resources. A whale processing station operated here between 1855 and 1857, with offshore whaling activities continuing through 1894 (Bertão 2006; Scofield 1954). In the 1860s, fishermen began to develop the Chinook salmon fishery in Crescent Bay, but upstream logging and mining activities sullied the spawning grounds and the local salmon population diminished. Salmon populations resurged following the decline of the mining industry in the 1870s, and several salmon canneries were established along the Klamath River in the mid-1880s. Once the first local spur of a rail system was completed in the early 1900s, the port was developed and local timber industries began to ship large quantities of lumber to the San Francisco area and other urban areas (McEvoy 1986).

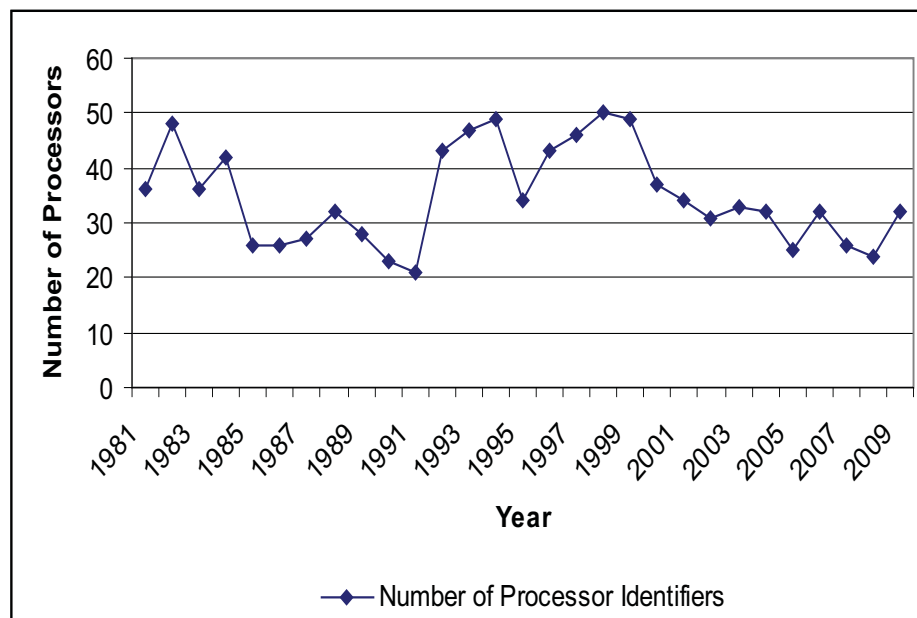


Figure 3-23 Number of Processors, Del Norte County: 1981-2009
Source: PacFIN 2010

Commercial and recreational fishing activities at Crescent City Harbor expanded following port improvement projects in the 1930s, including the addition of a breakwater to protect vessels from large swells and storm surge (Leidersdorf 1975). When federal funds for rebuilding a damaged wharf were not forthcoming, the local citizenry contributed their own resources to construct the aptly-named Citizen's Dock (Leidersdorf 1975; Powers 2005). Completed in 1950, Citizen's Dock was the area's primary seafood offloading terminal.

In 1964, a tsunami destroyed much of the harbor infrastructure. Subsequent reconstruction work, which included a new boat basin with a secure mooring area, 300 berths, and new offloading, processing, and boat building facilities, brought an influx of commercial and recreational fishermen to Crescent City. Shoreside receiving and processing activities increased as well. By the 1980s, three buyer-processors and four buyers were based here (Pomeroy et al. 2009a). A 2006 tsunami also damaged harbor infrastructure; repair work has been undertaken. The docks are being redesigned to mitigate the effects of potential future tsunamis. Repair and reinforcement costs are estimated at nearly \$22 million. Madar (2009a) reports that city and county officials have designated the harbor as a top priority in requested federal stimulus monies.

According to Pomeroy et al. (2009a), commercial and recreational fishing activities began to contract in the late 1970s following new regulatory measures for managing salmon and coast-wide groundfish populations. Key regulatory events affecting the salmon fishery include: establishment of the KMZ in 1979; implementation of the limited entry program in 1982; and reduction of the salmon season in the KMZ in 1984.

Fishing activities continued to contract throughout the 1990s and the 2000s following several key regulations affecting the groundfish fishery including: the implementation of the restricted access program in 1994; implementation of the NFMP in 2000; and the federal groundfish permit/vessel buyback program in 2003. El Niño events in 1982 and 1983, which resulted in significant declines in the abundance of ocean shrimp and other species, also deterred commercial fishing activities. In particular, significantly reduced salmon and groundfish landings along with rising costs of operating the harbor's wastewater treatment facilities affected shoreside receiving and processing operations. Between 1997 and 2001, three local buyer-processors ceased operations. Pomeroy et al. (2009a) report that the crab and Pacific whiting fisheries have generated extensive revenue and supported local infrastructure since 2001. The whiting fishery is subject to changing regulations and volatility in the marketplace.

Crescent City Harbor can accommodate approximately 230 resident vessels and approximately 500 transient vessels. Facilities include four docks, seven receiving stations, one commercial fish processing plant, an ice plant, hoists, a boatyard and fabricator, a fuel supplier, gear and tackle shops, a boat launch, and a marine supply store. Vessel repair and maintenance services are also available (Table 3-23). In total, approximately 20 businesses at or near the harbor provide goods and services in direct support of commercial and recreational fishing activities (Pomeroy et al. 2009a).

Reportedly, all 230 berths in the harbor's inner basin were typically being use on a year-round basis until occupancy began to decline in 1999. Between 1999 and 2003, the rate of occupancy averaged 68 percent (RRM Design Group 2006). Pomeroy et al. (2009a) report that the number of boats using the 500 seasonal slips along the outer basin declined by 90 percent between 1980 and 2008.

Local officials state that a declining number of local commercial salmon troll and groundfish trawl operations and diminished activity among recreational anglers have diminished harbor revenue. The discussants attribute the downturn in fishing to regulations intended to improve or conserve the Sacramento River and Klamath River Basin Chinook salmon stocks, and the groundfish vessel buyback program which resulted in the departure of 16 trawl vessels from the harbor.³⁴ McHugh (2005) reports that harbor operations have been additionally challenged by budget cuts, which in turn have necessarily led to staff layoffs, maintenance deferral, and infrequent dredging. Harbor officials have increased rental fees to make up for revenue lost to the egress of local fishing vessels. Port officials are also seeking to attract new retail businesses to the harbor area so as to diversify and increase revenues (Crescent City Harbor District no date; PFMC and NFMS 2008).

Crescent City officials have requested \$2.25 million in federal stimulus monies to upgrade and expand the harbor's seafood processing facilities and build a new wastewater treatment plant (Madar 2009a). Negotiations between the City and the existing processor are underway to allow the processor's effluent to be treated in the city's new treatment plant, an arrangement some observers say could result in significant economic benefits for the local economy.

Table 3-22 Crescent City Harbor User Groups, Infrastructure, and Services

User Groups	Harbor-Owned Infrastructure	Harbor Services	Resident Business Types
Commercial fishing Recreational fishing (charter, private boat and shore-based) Resident businesses Community residents Tourists	Docks/slips Inner Basin (~230) Outer Basin (variable) Launch ramp (2) Parking Offloading Infrastructure - Docks (4) - Hoists (6 receiving, 1 public) - Receiving stations (7) - Receiving/processing buildings (2) Other Infrastructure - Fish cleaning station - Work dock - Transient dock - Boatyard	Bilge Pump-Out Station Oil recycling station Bathrooms/showers Dredging of harbor channel and berthing Visitor berthing Fuel, water, ice Dock power Waste disposal and recycling Dry Storage	Fish buyers (6) Fish Processor (1) Electronics services (1) Marine supplies (1) Bait/tackle shop (1) Fuel Dock (1) Ice Plant (1) Commercial divers (4) Boatyard/Dry Dock (1) Restaurants (5) RV Parks (2) Dive shop (1)

Source: Pomeroy, C., C. Thomson and M. Stevens 2009a

³⁴ Some fishermen later bought back in to the fishery.

Crescent City Commercial Fisheries. Currently, about 120 captains call Crescent City homeport. Pomeroy et al. (2009a:10) report that the fleet include “five trawlers, 12 nearshore fishing operations, and about 100 crabber/trollers.” Nearshore fishing operations include six full-time and three part-time participants in the shallow and/or deeper nearshore rockfish fisheries, and ten fishermen in the coonstripe shrimp trap fishery. Four of the latter are relatively new to the fishery, having shifted from salmon to shrimp due to salmon closures.

The principal commercial species landed at Crescent City Harbor are Dungeness crab and various groundfish. In 2008, groundfish landings accounted for 19 percent of all fishery-specific revenues in Crescent City (CDFG 2009a). The groundfish fisheries involve use of hook-and-line for nearshore rockfish; trawl gear for Dover sole, petrale sole, and thornyheads; and trap and longline gear for sablefish. Other currently important fisheries include trawl fisheries for ocean shrimp and Pacific whiting.

Pomeroy et al. (2009a) report that about half of the vessels offloading at Crescent City harbor were historically owned by local captains, but that the ratio between resident and non-resident captains changed markedly following salmon and groundfish restrictions in the 1980s and 1990s. Today, nearly 75 percent of skippers and crew delivering at Crescent City are residents. However, non-resident captains or owners account for 100 percent of Pacific whiting deliveries (Pomeroy et al. 2009a).¹

Between 2000 and 2008, the most economically important commercial fisheries at Crescent City harbor were: Dungeness crab, sablefish, black rockfish, ocean shrimp, and Pacific whiting (CDFG 2009a). Coonstripe shrimp, salmon, thornyhead, albacore tuna, Dover sole, and petrale sole are also commercially important, but landings of these species have varied extensively during the last decade due to resource availability, regulations, and market demand.

Table 3-23 Ex-Vessel Value of the Top Five Species Landed at Crescent City Harbor: 2000-2008

Species	Total Revenue (\$)	Total Landings in Pounds	Average Annual Revenue (\$)	Average Annual Landings in Pounds
Dungeness Crab	83,984,270	49,073,464	9,331,585	5,452,607
Sablefish	4,476,850	3,442,660	497,427	382,517
Ocean (pink) Shrimp	2,556,477	6,968,159	284,053	774,239
Black Rockfish	2,042,694	1,166,033	226,966	129,559
Pacific Whiting	1,743,333	27,126,294	193,703	3,014,032

Source: CDFG 2009a

According to Pomeroy et al. (2009a), four on-site fish processing operations were based at Crescent City harbor in 1997. Today, one on-site buyer/processor and six buyers with receiving stations operate here.

¹ The U.S. Pacific whiting fishery mostly occurs off Oregon and Washington. Total allocation is divided between the U.S. (74%) and Canada (26%) (Pomeroy *et al.* 2010:28).

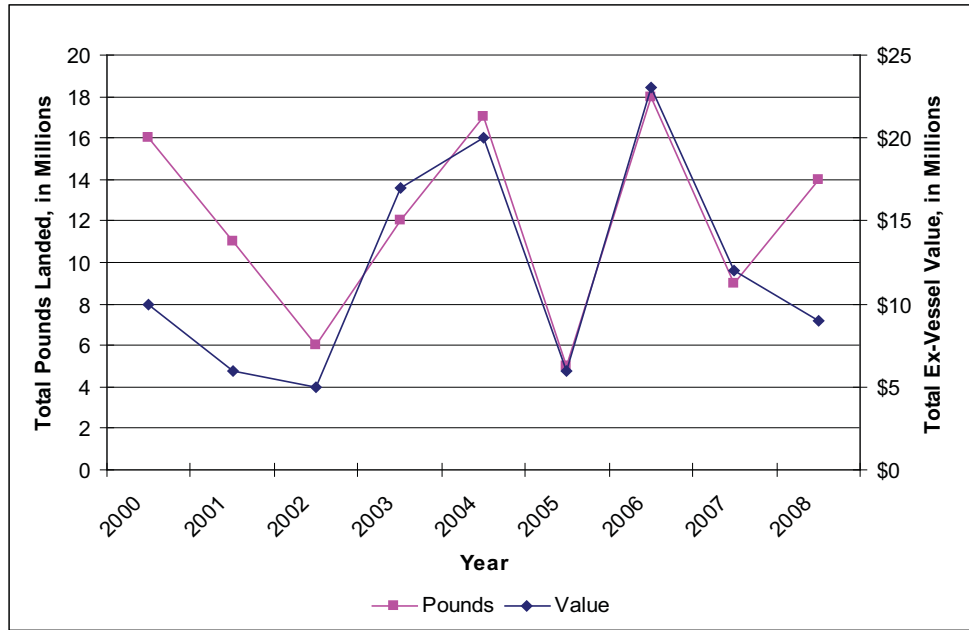


Figure 3-24 Total Pounds Landed and Ex-vessel Revenues of Primary Fisheries at Crescent City Harbor: 2000-2008

Source: CDFG 2009a

Madar (2009a) reports that local processing capacity is limited by wastewater treatment problems. Thus, while a portion of Dungeness crab, groundfish, and Pacific whiting are processed in Crescent City, some is transported for processing elsewhere. Coonstripe shrimp is captured and sold live. Some shrimp is sold directly to local restaurants and retail stores, but most is trucked to the San Francisco Bay area for distribution. A few nearshore rockfish fishery participants also sell their product directly to local venues. Currently, no albacore tuna buyers or processors are located in Crescent City; most tuna is sold in Oregon, though some fishermen sell directly to the public.

Dungeness crab is the principal species landed at Crescent City, in terms of both landings and value. Landings have ranged from a low of 1.1 million pounds valued at \$2.6 million in 2001 to a high of 12.9 million pounds valued at \$21 million in 2006. Between 2000 and 2008, crab landings at Crescent City accounted for 77 percent of the total value of all landings offloaded at the harbor for that period.

Historically, the region's crab resource has been actively pursued by the local fleet, along with salmon and/or albacore tuna in the summer and fall (troll); groundfish in the winter and spring (trawl or nearshore hook-and-line), or pink shrimp spring through fall (trawl). Key discussants believe the crab fishery has become more important in recent years as the various fisheries are increasingly restricted.

Currently, an estimated 100 local fishermen hold permits for the Dungeness crab fishery. Small vessels- less than 40 feet in length- comprise the majority of the Crescent City crab fleet. The small vessels carry fewer pots and tend to have a more restricted range, and thus many tend to set

their pots in relatively close proximity to the harbor. Non-resident vessels- from as far south as San Francisco and as far north as Washington State- also deliver crab to this port.

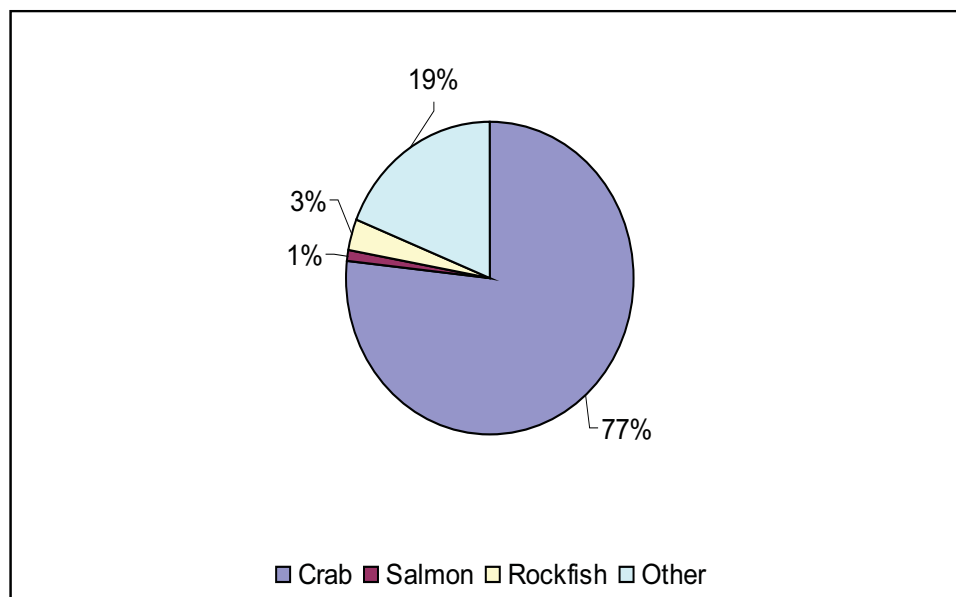


Figure 3-25 Percentage Value of Landings at Crescent City Harbor: 2000-2008

Source: CDFG 2009a

The crab season for the Crescent City area typically runs from December 1 through July 15. Fishermen are allowed to “pre-set” their pots up to four days before the designated start day, so the “pre-season” activity actually begins in early November, as fishermen bring their pots to the harbor for easy access. The heaviest ocean and shoreside activity occurs during December and January, due to initial abundance of crabs and high demand in the marketplace.

Some skippers fish extensively for crab during the first few months of the season, then switch to other fisheries such as groundfish or pink shrimp, depending on market conditions. A few large vessel operators also hold permits for the Oregon commercial Dungeness crab fishery. Many of the small-boat operations continue to pursue crab through the end of the season in July, especially if the ex-vessel price for live crab provides sufficient incentive.

The number of pots used per operation ranges from 170 to 1,000. This relates to the size of the vessel and level of investment of the skipper. Each crab trip takes between one and three days, depending on the proximity of the crab grounds to the port of delivery, the holding capacity of the vessel, and any delivery constraints set by the buyer/processor. Between one and four crew members may participate in the operation; two is most typical.

Nearly 90 percent of captains who made commercial landings at Crescent City in 2006 landed at least some crab that year (Pomeroy et al. 2009a). Some of the best crab grounds are said to be located within a few miles of the harbor, and the area just south of Point St. George reef is said to be particularly important grounds for small boats. Most captains set in five to 85 fathoms of water. Abundance is not uniform and crabbers use their experience and share information about the currently most productive grounds.

There are at least six buyers in Crescent City. One offloading station receives catch for non-resident buyers. One buyer processes crab on site, but a large volume is trucked outside the county for processing. One local market sells fresh seafood.

Until the establishment of the KMZ in 1979, salmon was one of the principal fisheries at Crescent City. This and subsequent changes such as allocation between tribal and non-tribal fisheries, and season closures are said to have impacted participation in the fishery. According to one former salmon fisherman, “the last good year for salmon in Crescent City was 1987.” Between 2000 and 2008, salmon landings at Crescent City accounted for 1.3 percent of all fishery-specific revenue at the harbor for that period.

Some residents continue to purchase their California Salmon Permit to prevent being shut out of the fishery in future years. A few local fishermen also purchase Washington or Alaska permits. Some fishermen have shifted into different fisheries. Since the 1980s, many fishermen who once fished salmon have shifted into the nearshore rockfish hook-and-line, shrimp trawl, albacore tuna troll, or crab pot fisheries. Many respondents expressed feelings of uncertainty about the future of salmon fishing in the North Coast region. A tribal commercial salmon fishery occurs on the Klamath River. Crescent City buyers purchase some of the in-river salmon for distribution on the East Coast.

The nearshore groundfish/rockfish fishery around Crescent City has changed dramatically since the early 1990s. Prior to implementation of the federal limited entry program in 1994, more than 70 resident vessels participated in the fishery. The number of participating vessels fluctuated following a drop in individual quotas from 10,000 pounds per month to 6,000 pounds every two months, and a state-implemented restricted access program. The fishery expanded in the late 1990s as some deepwater groundfish fishermen moved inshore to participate in the nearshore and live fish fisheries. Lower quotas resulted in diminished supply and significantly higher ex-vessel prices paid for live fish, essentially turning nearshore groundfish from a high volume/low value fishery to a low volume/high value fishery.

Approximately 12 skippers currently participate in the nearshore groundfish fishery conducted from Crescent City. The operators target a variety of rockfish and other species in state waters immediately north and south of the harbor. Vessels are typically less than 36 feet in length. The nearshore fleet employs three types of hook-and-line gear, depending on the target species: rod and reel for black rockfish; and vertical and bottom longlines for lingcod, cabezon, and other rockfish, such as quillback, china, and copper. Between 2000 and 2008, commercial rockfish landings at Crescent City accounted for about three percent of the all fishery-specific revenue.

The commercial limited entry and open-access fixed gear and hook-and-line fishery is open year-round in the waters offshore Crescent City. However, most fishing is done in the late spring and summer months, due to notoriously rough weather and high seas along this part of the coast. Respondents note they may fish between 60 and 100 days per year, depending on weather, market conditions, and quotas. Nearshore skippers typically fish with one or two crew members, or sometimes solo. Most rockfish fishermen also participate in the crab fishery, and some also participate in the coonstripe shrimp pot fishery.

Although the nearshore fleet fishes as far south as Reading Rock and as far north as the mouth of the Smith River, there is a general preference for grounds closer to port, such as Point St. George Reef. Closer grounds involve less fuel costs, incur fewer safety risks, and reduce mortality rates of catch intended for the live fish market. Fishermen also identify the reef and rocky areas around Crescent City as consistently productive.

Two operations in Crescent City tend to specialize in rockfish. Most of the catch is offloaded at Citizen's Dock and trucked to live fish markets in Oakland or San Francisco. Some fishermen will truck their own catch to San Francisco, but most sell part of their catch directly to the public, restaurants, or other retail establishments. For a short time, fishermen worked together to sell their catch directly to various markets without the help of buyers, but this effort was short-lived. Respondents familiar with the bottom longline fishery claim the depth restriction has effectively closed off most of the longline grounds in the area, as well as productive underwater pinnacles, such as Reading Rock.

Crescent City Recreational Fisheries. Crescent Bay has long been a favorite with recreational anglers. Close proximity to productive fishing grounds attract many enthusiasts. However, challenging weather and sea conditions limit the number of days in which it is safe to fish. Most recreational fishing occurs during the summer months when conditions are relatively benign.

Anglers use private or chartered boats, or fish from jetties or beaches in the area. Most anglers contacted during this study said they fish for pleasure and relaxation, and because they enjoy eating fish. Many report sharing their catch with friends and family. Shoreline anglers have been more likely than boat-based fishermen to state that they fish for food; the latter often point out that costs associated with gear, fuel, slip rentals, and vessel maintenance make catching one's fish more expensive than buying it.

Local and visiting shore-based anglers use rod and reel to target rockfish, lingcod, cabezon, surf perch, California halibut, redbait surf perch, striped sea perch, and walleyed sea perch. Some fishermen use A-frame nets to catch surf smelt, and poke-poles to catch rockfish, cabezon, and monkey-faced eels. Both of the public piers at Crescent City Harbor are considered "hotspots" for recreational crabbers between the months of December and July. Reportedly, it is not unusual to find crab pots tied every seven to ten feet around the entire end of the pier, with upwards of 50 crab pots in the water during the warmer days of the season. Other species typically landed at the pier include: kelp greenling, rock greenling, shiner perch, jacksmelt, sardines, and starry flounder.

Beach fishing occurs at Clifford Kamph Memorial Park, Enderts Beach, Kellogg Beach, Point St. George Beach, and South Beach. Anglers also fish at Pelican State Beach north of Crescent City, and at Wilson Creek and High Bluff Beaches in the Klamath area. Clamming is permitted north of Point St. George and south of the harbor in alternate years. Clam species found in this area include razorback, littleneck, and gaper.

Local public officials say that revenue derived from recreational fishing contributes significantly to the local economy. An estimated 60 to 70 percent of anglers come from outside the county or state, patronizing local motels, restaurants, gas stations, and marine supply stores.

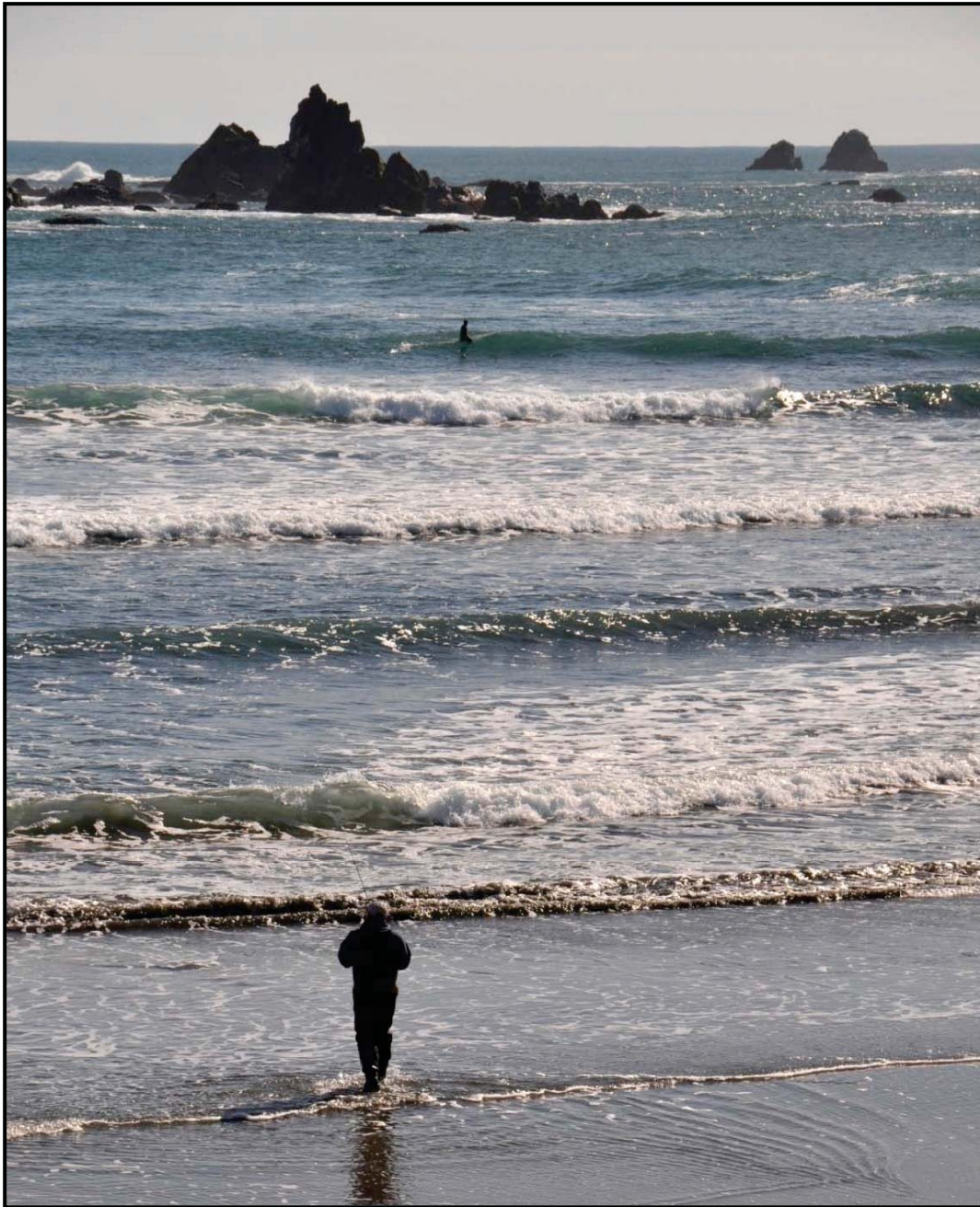
Salmon has long been an important recreational fishery conducted from Crescent City. According to longtime observers, as many as 500 private recreational vessels could be seen fishing for salmon during seasons past. However, KMZ regulations have winnowed the fleet, and the 2008 and 2009 statewide strictures precluded fishing altogether.

Currently, an estimated 50 to 80 recreational fishermen launch private vessels from the harbor to pursue rockfish (particularly blue and black), Dungeness crab, lingcod, Pacific halibut, and occasionally albacore tuna. Boat anglers seeking rockfish often head about five miles north to Point St. George's Reef, or to certain locations up to ten miles south. Some anglers say they prefer the scenic beauty of the northern grounds, but also the protection that locations around the southern grounds offer from wind. California halibut, salmon, crab, and coonstripe shrimp are available in areas close to the harbor.

The number of charter vessels operating from Crescent City Harbor has diminished during the last several decades. In 1980, four skippers conducted charters here, offering rockfish year-round, salmon during the summer, tuna during the fall, and crab in the winter. Following significant reductions in opportunities to fish for salmon and groundfish, however, the captains began moving to other ports in the late 1990s or ceased operations altogether (Pomeroy et al. 2009a). Today, only one intermittent and one full-time charter operation remain active in Crescent City. The operator anticipates that he may have to offer crab trips in order to keep his business viable, particularly if regulations continue to constrain salmon and rockfish fishing seasons. The captain reports that there is little demand for sightseeing trips.

A small but growing contingent of local recreational kayakers fish around Crescent City, typically for rockfish, cabezon, and California halibut. Most fishing occurs in waters up to about 70 feet in depth and within two miles from shore. Some kayakers launch from Point St. George, while others launch from False Klamath, where rockfish are said to be abundant in the area's rocky habitat.

Given the often rough surface conditions and cold temperatures, Del Norte County is not a popular dive destination. A few experienced and hardy divers target lingcod, rock scallops, cabezon, and rockfish, primarily from Point St. George and False Klamath.



Recreational Angler and Surfer at Point St. George in Del Norte County, Spring 2010

4.0 Key Human Components of North Coast Marine Ecosystems

The following pages extend description of North Coast fisheries in a way that is ultimately intended to facilitate socioeconomic assessment of establishing new marine reserves in as yet undetermined nearshore locations across the region. Here we use basic principles of human geography and human ecology to further document: (1) patterns of use of the marine environment by the commercial and recreational fishing fleets; (2) social and economic connections between the principal user groups and fishery support sector businesses in the adjacent communities; and (3) factors that condition use of the marine environment and interrelationships between the various fisheries sectors and host communities. The resulting description is intended to advance understanding of the social and economic components of the fisheries-related ecosystems of the North Coast, and to aid in providing a valid basis for assessing how and to what extent those components and systems could be affected by closure or further regulation of certain North Coast fishing grounds.

Describing marine fisheries in terms of interacting parts and total systems is in keeping with an ecosystem approach to fisheries research and management. Ecosystem principles are increasingly used to model complex marine systems and the physical, biological, and human components and interrelationships that comprise those systems. This approach was formally advanced in 1998 by the Congress-mandated NOAA Ecosystem Principles Advisory Panel (EPAP), and it is advocated in *An Ocean Blueprint for the 21st Century* (U.S. Commission on Ocean Policy (2004), in *America's Living Oceans: Charting a Course for Sea Change* (Pew Oceans Commission 2003), and in the *California Ocean Protection Act* (California Ocean Protection Council 2004). The new *Executive Order for Stewardship of the Ocean, Our Coasts, and the Great Lakes* (The White House, July 2010) also incorporates ecosystem principles in calling for the establishment of a National Ocean Council and extensive marine spatial planning.

Notably, Section 1, Part 35505 (c) of the California Ocean Protection Act (COPA) emphasizes the importance of ecosystem principles for ensuring the future health of California's nearshore marine environment:

The preservation of the state's ocean resources depends on healthy, productive, and resilient ocean ecosystems. The governance of ocean resources should be guided by principles of sustainability, ecosystem health, precaution, recognition of the interconnectedness between land and ocean, decisions informed by good science and improved understanding of coastal and ocean ecosystems, and public participation in decision-making.

As envisioned by EPAP, COPA, the U.S. Commission on Ocean Policy and others, an ecosystem approach emphasizes an understanding not only of oceanographic and trophic factors and relationships, but also of pivotal human relationships associated with use and governance of use of the marine environment. For instance, EPAP (1998:47) states that:

Managers must understand the complex linkages between natural ecosystems and the economic, social, and political dynamics of human systems. Humans are integral components of ecosystems, and their interests, values, and motivations must be

understood and factored into resource management decisions. Information on human systems is as important as that [regarding] natural systems and must be included in any ecosystem research and management efforts (EPAP 1998:47).

Thus, it is widely recognized that marine ecosystems include both biophysical and human components, and that use of ecosystem principles dictates an accounting of interaction between the two. Here we emphasize the importance of understanding key attributes of the people and groups who regularly interact with the nearshore marine environment of the North Coast, and the nature of those interactions in the near- and long-term. Just as the biophysical sciences are used to examine the interacting components and dynamics of marine systems, the social sciences are used here to examine human components and aspects of marine systems and dynamic interactions between humans and the marine environment.

4.1 Bounding the Systems

Overview and Approach. The preceding chapter describes relevant aspects of the commercial and recreational fisheries of the North Coast. The individuals and groups that comprise and manage those fisheries are pivotal elements of California's marine ecosystems. Such individuals and groups value, use and exert pressure on, extract economic and non-pecuniary benefits from, and govern human use of the marine and adjacent terrestrial environments. Clearly, human interaction with the physical marine environment is as multi-faceted and complex as the physical environment itself.

The foundation of all science, social science included, is observation. In this case, we are observing and/or are using methodological proxies for observation of human interaction with the nearshore marine environment of the North Coast. Such proxies include non-obtrusive and participant observation, unstructured and semi-structured in-depth interviewing, use-area mapping exercises, review-related correspondence, literature review, and various forms of archival research. In this case, all such methods were used, with extensive in-depth fieldwork and archival research undertaken between January and June 2010. Fieldwork was conducted from base locations in Fort Bragg, Eureka, and Crescent City.

As of June 2010, over 190 interviews had been conducted with North Coast commercial fishermen, charter operators, seafood distributors, marine goods and service providers, recreational users, recreational fishing and tourist support providers, public harbor and private marina staff, mariculture business owners, tribal representatives, and local experts on commercial and recreational fishing. Twelve user group meetings and MLPA organized fieldtrips had been attended, and over 90 mapping exercises had been conducted. Average interview lengths ranged from one to three hours; follow-up interviews were conducted as necessary. Project fieldwork is ongoing and will continue through November 2010.

The resulting data and analyses provide an empirical basis for understanding who, how, where, when, and why spatial regulations could affect persons who use and/or derive benefits from the nearshore marine environment of the North Coast, and thereby affect the marine environment itself. An initial and essential step in this process is basic description of relevant human

ecological and geographic dimensions of North Coast marine ecosystems, as provided in the previous chapters and extended in the current chapter.

North Coast Geography and Focused Fishing Activity. The previous chapters are organized by county, and within each county, by port. This is logical and appropriate in that extensive fishing-related social and economic interaction occurs in or in association with each port, and there is relatively more interaction between ports within each county than there is between ports across county lines. This is a natural outcome of the rural nature of the region, and the fact that population centers are typically separated by a considerable distance and a challenging road system.

Moreover, the small boats that comprise the majority of fleets in the region necessarily tend to operate within a relatively short distance from home, typically not much more than 20 miles, and more usually within about 10 miles. As such, commerce and social interaction associated with fishing tends to occur in a spatially concentrated way in just a handful of community settings along the North Coast. There are many inbound and outbound social and economic pathways to be sure, but Crescent City, Eureka, Trinidad, Shelter Cove, Fort Bragg, Albion, and other North Coast towns and cities may be seen as somewhat akin to fishing, timber, and tourism-oriented communities in Alaska where the landscape also forces considerable geographic isolation.

The geography of the region thus naturally renders fishermen part of a specific community. Fishery participants may interact in and consider themselves part of more than one community, but more often than not fishermen tend to develop affinity with a particular place, maintaining various familial and/or other social ties and some degree of dependence on locally available goods and services, including mooring space.

There certainly are deviations from the localized fishing community model. For instance, fishermen who trailer their boats can reach points of ocean access many miles from their home community. Although this kind of mobility comes with its own costs, such as those associated with the purchase, maintenance, use, and repair of trailers and trucks, a considerable number of participants in the region's commercial and recreational fisheries live some distance from the main port towns and cities. Moreover, the larger vessels at each port are naturally equipped with relatively large fuel tanks and live-aboard amenities. Some large vessel captains fish or crab in waters as far north as Washington and Alaska, and some fish as far south as Mexico. This fleet may fish and utilize port services throughout the North Coast region and beyond. Large vessel captains and crew do tend to reside in or near their homeports, but some tend toward itinerancy.

The nature of distant water fleets notwithstanding, participants in North Coast fisheries typically do operate from and ultimately return to a homeport or adjacent rural area where basic fishing-related and other amenities, goods, and services may be acquired within a reasonable distance of home, and where various fishing-related social and economic interactions occur and relationships develop over time. Certain requisite goods and services are available only in the larger towns and cities, and thus even those fishermen who live in outlying areas of the North Coast develop some affinity with one or more port communities.

Tourists also tend to develop ties with California coastal communities. Although some may visit Del Norte, Humboldt, or Mendocino Counties only once, others may return a number of times, contributing to the local economy and developing social ties as they do. Many tourists arrive with an interest in fishing and a variety of local businesses are available to serve their fishing-related needs. In some cases, people develop familiarity and appreciation for a certain North Coast community and its fishing potential and return on a seasonal basis.

In sum, the physical geography of the North Coast tends to foster development of relatively distinct fishing communities, the various components of which may be considered important parts of the region's marine ecosystems. Clearly, such communities are never fully discrete entities. Rather, they should be seen as places where human interaction occurs in a focused way in association with fishing and fishing-related industry. The nature of fisheries-related physical-human and human-human interaction plays out in a number of alternately straightforward and complex ways along the North Coast, as discussed below.

4.2 Select Human Aspects of North Coast Nearshore Ecosystems

Humans are critically important components of nearshore and offshore marine ecosystems around the world. As this report makes clear, even along the rugged coastline of rural Northern California, many people are deeply and regularly engaged in direct and indirect use of the marine environment - fishing, transacting and distributing seafood, and/or providing support services to the commercial and recreational fishing industries. The importance of these activities is amplified in a region with relatively few employment alternatives.

Captains and crew certainly fish and crab in federal jurisdiction waters along the North Coast, but crabbing and fishing tend to occur with greatest intensity in the rich nearshore zone within and around the three mile limit. Thus, for many captains, trips tend to occur within sight of land; and vessel size, associated fuel capacity, and presence or absence of onboard amenities ultimately determine how far one might travel along the coastline. Day or part-day (or night) trips are common for small vessels, while longer trips are more common for medium and large vessels, depending on the fishery, weather and sea conditions, the nature of the bite, and other factors.

This section describes recent patterns of use of the marine environment and the nature of linkages between fleets using such areas, and the shoreside sectors that support such use. Thus, the section summarizes and/or graphically depicts: (a) which fleets tend to use which parts of the North Coast nearshore environment for which species, at what general level of intensity, and with what gear; (b) important shoreside service sector businesses and linkages between this sector and fleets operating from the principal North Coast ports and harbors; and (c) important challenges currently facing the region's commercial and recreational fishing industries.

Eureka-Area Fleets, Fisheries, and Support Sector Businesses. Fieldwork and review of various archival data indicate that between 100 and 120 licensed commercial fishermen reside in the Eureka area. The principal fisheries are: Dungeness pot; groundfish trawl; rockfish/lingcod hook-and-line; pink shrimp trawl, albacore troll; whiting trawl; and salmon troll. Two major seafood processing firms and four buyer-distributors serve the local fleets. The local commercial fleet is comprised of approximately 80 crab vessels, 15 to 20 salmon trollers, eight to ten

trawlers, and five to ten smaller groundfish vessels. Pomeroy et al. (2010) note that the recent average number of Eureka-area commercial fishing trips totaled 2,200 for 2007. As described in Chapter Three, extensive public and private sector infrastructure is available to facilitate vessel mooring, ocean access, and fuel services.

As depicted in Table 4-1 and Map 4-1 below, Eureka-based captains and crew pursuing Dungeness crab with medium-sized vessels³⁶ tend to lay their gear in the nearshore zone between Orick and Eel River, with particularly intensive activity in the nearshore area extending from just south of Trinidad to Fields Landing. Larger crab vessels operating from Eureka use parts of the same general grounds, but will also typically work twice as far from port and occasionally well outside the study area in both state and federal waters. Favored grounds for locally based commercial salmon captains tend to be in the nearshore zone west and southwest of Eureka, with some captains trolling well north and south of the port, and occasionally well outside the study area. Map 4-1 depicts the typical range and grounds of importance to commercial salmon fishermen in the North Coast region. Areas of most intense use and thus greatest importance are indicated by the darkest shading.

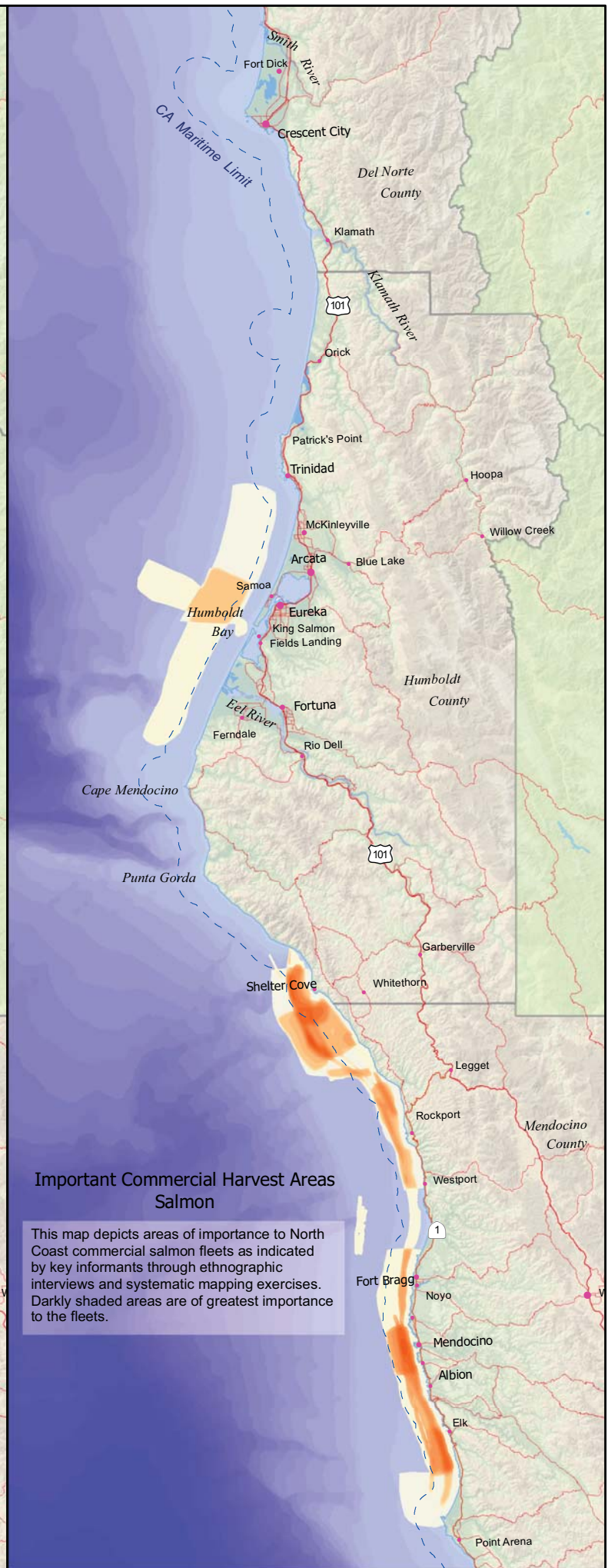
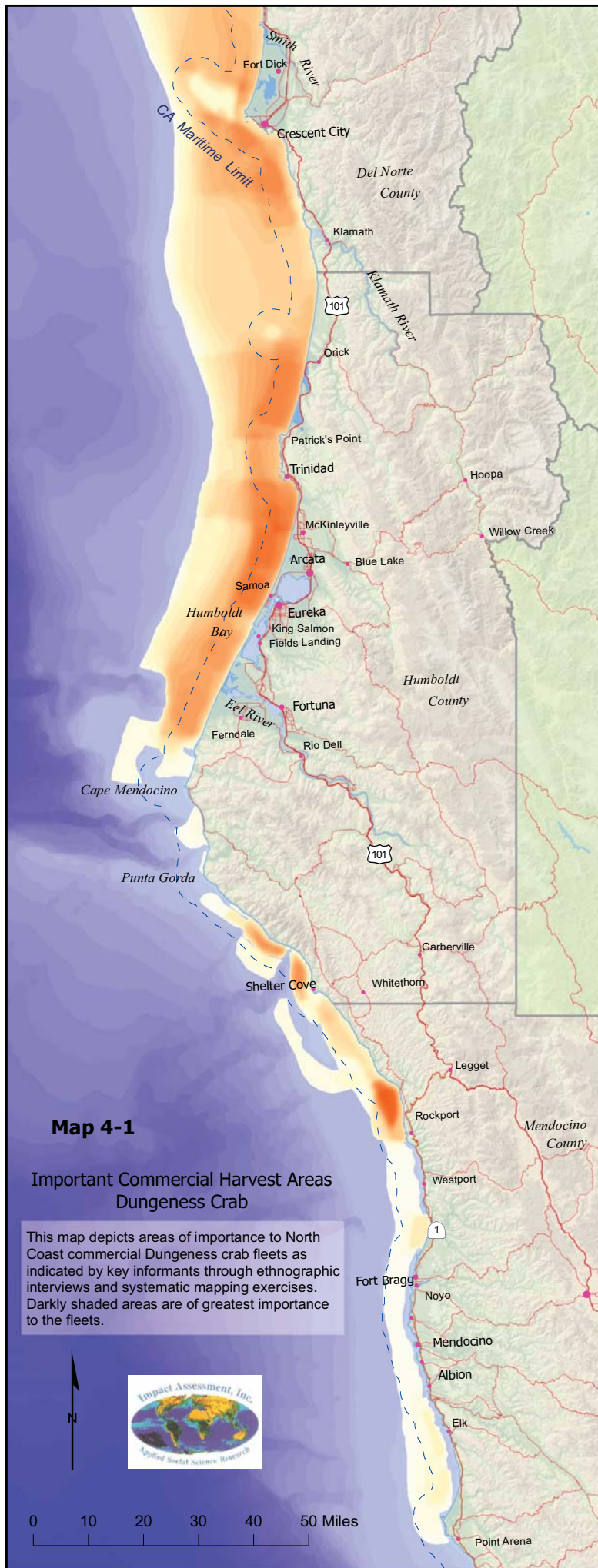
Range and important harvest areas can vary based on a variety of physical environmental and human factors across the North Coast region. In many cases, some fishermen in a given port are seeking new grounds and experimenting with new technology, novel gear configurations, and various patterns of navigation. Such captains may well exceed the typical range of other captains in a given fleet or differ significantly in terms of preferred grounds. While some captains will not readily discuss such issues, the data we are able to provide has been validated through extensive interaction with key informants over the course of many months.

It must also be noted that, in this and subsequent community-based descriptions, we depict typical vessel range and important use areas at a level of resolution that does not compromise proprietary or confidential data agreements or otherwise jeopardize the well-being of fishermen whose livelihoods may well depend on their capacity to successfully pursue living marine resources in the nearshore environment. Thus, a reasonable margin of error is built into the cartographic representation and tabular information provided in the following discussions.

Table 4-1 Important Use Areas and Range of Eureka-Based Commercial Fishing Fleets

Principal Fishery	Vessel Size Category	Important Use Areas and Range
Dungeness Crab	Large	Locally to 35 nm north to 30 nm south and outside of study region in state and federal waters
	Medium	Locally to 12 nm north to 16 nm south, primarily in state waters
Salmon	Medium	Locally to 16 nm north to 16 nm south and outside of study region in state and federal waters

³⁶ Vessel characteristics tend to vary by fishery; for sake of generalized characterization, here we define large vessels as greater than about 45 feet in length overall (LOA), with extensive range and capacity; medium-sized vessels are between about 28 and 44 feet LOA and are relatively more limited in range and capacity; small vessels are usually 14 to 25 foot and may be easily transported by trailer and most limited in terms of range and capacity.



As the principal coastal population center in the region, Eureka is in various ways important to all North Coast fisheries. Certain goods and services available here can be hard to acquire elsewhere, such as: comprehensive hull construction and repair; various fabrication services; certain marine engine and steering hydraulics parts and services; specialized seafood distribution services, and so forth. Moreover, the resident populations of commercial and recreational fishermen are to a large extent dependent on locally available routine and specialized marine goods and services. Although internet-based purchase of marine hardware is increasingly common, residents of Eureka and outlying areas often take advantage of the knowledge and services available at the local storefront.

Key persons in the public sector report that local businesses are adequate for serving the needs of visiting and resident recreational anglers. There is, however, some reported difficulty in acquiring small motorized boats since a formerly well-patronized small vessel sales firm recently closed due to closure of the recent salmon seasons. A dive shop and a firm specializing in high-quality tackle also recently went out of business, in large part due to the economic recession.

Table 4-2 below depicts the principal fisheries service sector businesses located in the Eureka area (including McKinleyville, Arcata, Field's Landing and surrounding areas). Of note in the table are the large number of sales, repair, and fabrication businesses in general, and the obscured but actual importance of businesses that provide fishing-related goods and/or services in conjunction with other goods and services. Such businesses include: local lumber yards, hardware stores, industrial supply firms, grocery stores, and so forth.

Table 4-2 Important Components of the Marine Fisheries Support Sector: Eureka

Service or Product	Number	Description
Boatyard	2	One fulltime active facility and one providing intermittent haul out services
Ship's store/gear supplier	4	Variety of commercial gear supplies available
Welding shop	1+	Specialized marine welding available
Marine electronics sales/service	1+	Variety of VHF, GPS, Remote sensing products
Marine engine repair	2+	Specialized diesel, four-stroke, and two-stroke repair
Marine fabricator/machine shop	5	Vessel, gear, engine, parts fabrication services
Refrigeration specialist	1+	Critical commercial fishery support
Wood worker	1	Repair and brightwork
Fiberglass specialist	1	Hull repair
Airport	3	Jet services and extensive cargo options available
Charter service	3	Fishing guides and charter fishing services
RV parks/private marinas	2	Often accommodate visiting anglers
Restaurants/hotels/motels	Numerous	Often serve visiting anglers
Tackle shops/outfitters	7	Serve resident and visiting anglers
Large seafood processors	2	Critical component of commercial service infrastructure
Seafood buyers/distributors	4	Critical component of commercial service infrastructure
Harbors/marinas	2	Serving many fishing vessels
Trips* (2003-2007)	2,211	Average trips/yr. for principal commercial fisheries
Miscellaneous	Numerous	Lumber, hardware, plumbing, paints, plastics, industrial

*Pomeroy et al. 2010

Extensive discussions and research interaction with key participants in Eureka-based fisheries indicate a general level of satisfaction with the range and quality of locally available marine products and services. Eureka's fisheries support sector has evolved over many decades,

expanding, contracting, and specializing in response to: changing availability and abundance of various marine resources; development of new vessel, engine, and fishing gear technologies; changing market conditions; changing fishery demographics; and various other factors. Conversely, the presence or absence of certain services has conditioned the capacity and nature of the fleets. For instance, loss of rail service has changed the manner in which goods and services are transported to and from Eureka, though express air services have facilitated rapid transport of seafood products to and from markets elsewhere in North America, Asia, and beyond. Of note, some participants in Eureka's seafood harvest and distribution sectors are concerned about the recent loss of cold storage capacity in the city, as it is widely felt that this may limit the availability of frozen bait.

A variety of requisite services are available in Eureka, and in fact, the Eureka fishery service sector is said to be widely patronized by vessel owners and operators from Fort Bragg and Crescent City, and from various towns and rural areas in between. The city may be seen as an important human geographic nexus of fisheries-related goods, services, and socioeconomic interaction in the region. For instance, in addition to various service businesses in the processing and distribution sectors, there are options for welding, woodwork, electronics, fiberglass, refrigeration, and general and specialized fabrication services. It should be noted that there is significant specialization in some services. For instance, the work performed by machinists and fabricators in the Eureka area differs based on specialized knowledge of the various types, makes, and configurations of engines, transmissions, and hydraulic systems used within and across the small, medium, and large vessel fleets and various fisheries in the North Coast region. Some fabricators specialize in gear rigging, and this specialty also varies by fleet and fishery.

Given periodically high demand for certain local services, and long distances to alternative service providers available at other major West Coast ports, acquiring marine-related service in an expedient manner in Eureka can be problematic at times. This can bear significant implications for operators who are unable to fish until vessel or engine repairs can be made or gear fabrication or repair services can be provided. Generally speaking, however, parts and products themselves can be rapidly acquired via air cargo services available at Murray Field and Eureka Municipal Airport in Eureka, and at Arcata-Eureka Airport in McKinleyville.

Table 4-3 below provides a basic indication of the local socioeconomic context within which Eureka fisheries and fisheries support services are undertaken. These are a select few of many variables that indicate local and regional economic stress and thus the importance of fishing and other forms of economic opportunity in the region.

As noted in the table, Eureka is a small city, located considerable distances from the main adjacent population centers and ports of Crescent City and Fort Bragg. The unemployment rate is high relative to that of the nation (the national rate was 9.5 percent in June 2010), though it is equal to the current rate for California as a whole. The local median income figure is considerably lower than that of the state as a whole, and the number of persons below the poverty line is quite high when compared to the state and national figures (the national figure was 13.2 percent in 2008).

As noted previously, the socioeconomic assessment work conducted by PFMC & NMFS (2006b) suggests that Eureka is vulnerable to detrimental changes to the region's fisheries. This follows from findings holding that there is a significant level of localized dependence on fishing-related industry and relatively few viable economic alternatives in the region.

Table 4-3 Select Socioeconomic and Geographic Factors: Eureka

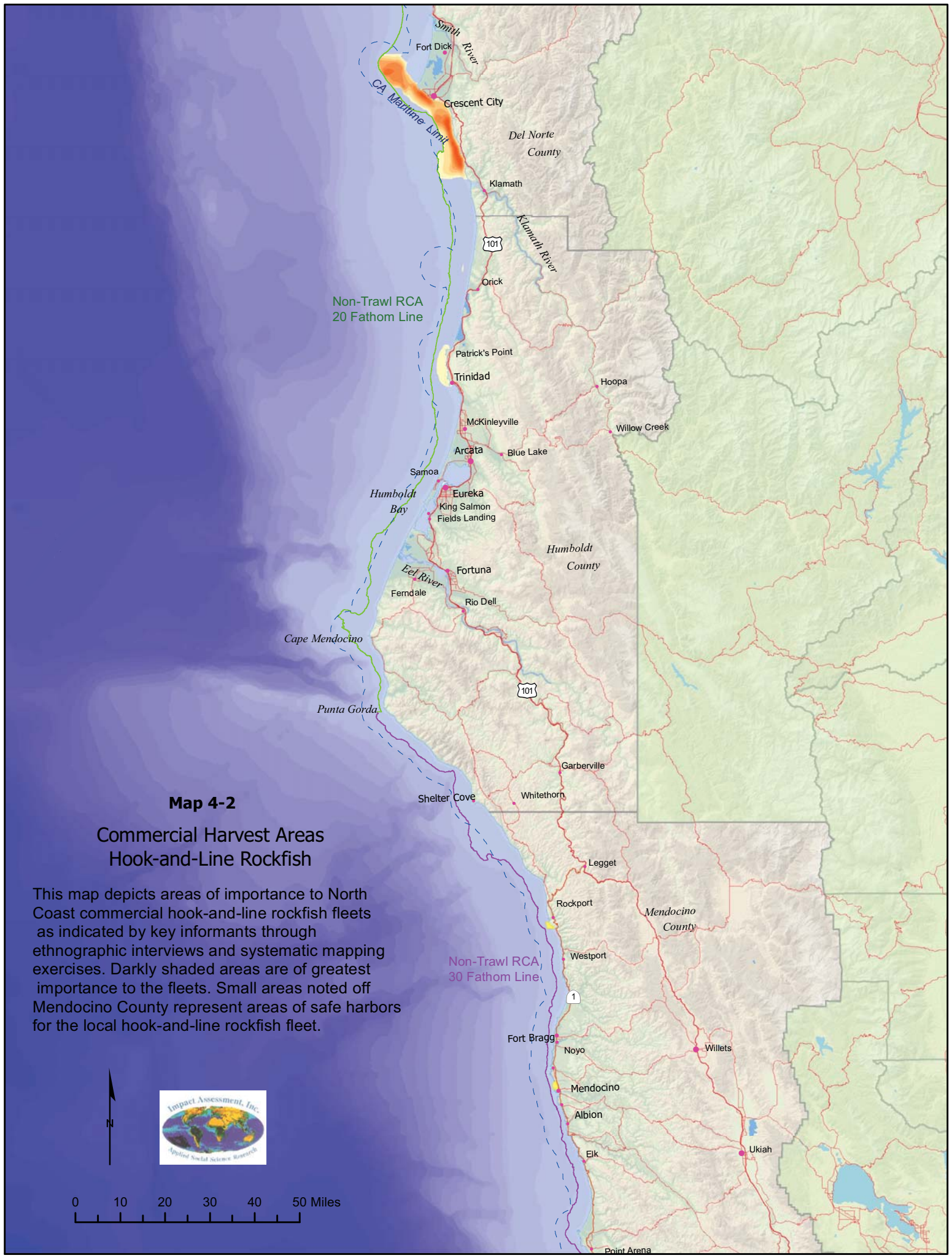
Factor	Description
Total Population	26,128 persons
Principal Forms of Economic Activity	Government, Retail Trade, Transportation, Utilities, Commercial Fishing, Tourism, Agriculture
Rate of Unemployment*	13 percent (vs. State of California: 13 percent)
Median Family Income**	\$43,603 (vs. State of California: \$61,154)
Persons below Poverty Level	20.3 percent of population (vs. State of California: 13 percent)
Distance to Significant Population Centers	Crescent City: 84 m; Fort Bragg: 134 m
Level of Community Vulnerability/Resilience †	Vulnerable: high level of dependence on commercial fishing; low level of resilience

Source: U. S. Census 2009; CDF&G 2007; Pomeroy et al. 2010; BEA 2009 *EDD unemployment rates for February 2010; ** Incomes in 2008 inflation-adjusted dollars ; † cf. PFMC & NMFS (2006b)

Economic challenges notwithstanding, public officials are optimistic that the 17,000-square-foot Public Fisherman's Terminal Building, currently in the design phase, will significantly augment existing commercial fishing infrastructure in the area. The facility will be located adjacent to the existing Fisherman's Dock, with dedicated space for extensive seafood processing and distribution activities, and retail sales.

Trinidad Fleets, Fisheries, and Support Sector Businesses. Fieldwork and review of archival data indicate that at least 17 licensed commercial fishermen and several charter operators live in the Trinidad area. Each operation also typically includes one or two crew members, most of whom also live in the Trinidad and/or adjacent rural areas. The principal fisheries conducted from Trinidad Bay are: Dungeness crab pot; black rockfish hook-and-line; and salmon troll. One large scale wholesale buyer, a number of smaller buyers (some of which are retail markets), and a small seafood processing operation serve the local fleets. The local commercial fleet is comprised of 17 small- and medium-sized crab vessels and small rockfish boats. Pomeroy et al. (2010) report that just over 1,000 commercial crab and rockfish trips were made from the Trinidad area between 2003 and 2007.

Trinidad-based captains and crew pursuing Dungeness crab with medium-sized vessels tend to set their pots in the nearshore zone between Orick and Trinidad Bay, and particularly between Patrick's Point and Trinidad Head. Larger crab vessels utilize some of the same grounds, but also frequent offshore grounds in and beyond other state waters and federal waters across the larger region (see Map 4-1). Locally based rockfish fishery participants tend to target nearshore species in waters just north and south of Trinidad (see Map 4-2).



Map 4-2

Commercial Harvest Areas Hook-and-Line Rockfish

This map depicts areas of importance to North Coast commercial hook-and-line rockfish fleets as indicated by key informants through ethnographic interviews and systematic mapping exercises. Darkly shaded areas are of greatest importance to the fleets. Small areas noted off Mendocino County represent areas of safe harbors for the local hook-and-line rockfish fleet.

Table 4-4 Important Use Areas and Range of Trinidad-Based Commercial Fishing Fleets

Principal Fishery	Vessel Category	Important Use Area and Range
Dungeness Crab	Small and Medium	Locally to 30 nm north and 15 nm south in state and federal waters
Nearshore Rockfish	Small	Locally to 15 nm north, primarily in state waters

As described in Chapter Three, apart from the infrastructure and services available at Trinidad Rancheria pier, relatively few support services are available for resident and non-resident commercial fishermen and anglers. A variety of local businesses accommodate visiting anglers. These include a tackle shop and numerous campgrounds, restaurants, and lodging facilities, among others. But fishery participants typically order specialized goods by phone or online, and/or travel to Eureka to purchase specialized goods and services

Table 4-5 Important Components of the Marine Fisheries Support Sector: Trinidad

Service or Product	Number	Description
Boat yard	0	--
Gear supplier	0	--
Welding shop	0	--
Marine electronics sales/service	0	--
Marine engine repair	0	--
Marine fabricator/machine shop	0	--
Vessel maintenance/repair and/or sales	0	--
Refrigeration specialist	0	--
Airport	1	Located in McKinleyville; 10-minute drive to Trinidad
Charter fishing services	6	Fishing guides and offshore charter fishing services
RV parks/campgrounds	Numerous	Often accommodates visiting anglers
Restaurants/hotels/motels	Numerous	Often accommodate visiting anglers
Tackle shops/outfitters	2	--
Seafood processors	1	Small local operation
Seafood buyers/distributors	5	One large wholesaler, two retailers, two small buyers/distributors
Harbors/marinas	1	Sheltered access ramp and popular pier inside the cove
Commercial Fishing Trips (5 yr. avg.) *	1,049	Principal commercial fisheries
Miscellaneous	--	Fishermen often purchase goods & services from Trinidad- and Eureka-area businesses that are not dedicated solely to fisheries support

*From Pomeroy et al. (2010)

Mooring, ocean access, and offloading opportunities at Trinidad Pier are particularly important to the local commercial fishing fleet. Conversely, use fees support maintenance of the associated facilities. The tourist sector is also dependent on recreational fishing activity. For instance, at least nine vacation rental units are typically used by recreational fishermen during the course of a given season, and a variety of RV parks and campgrounds are also regularly used by visiting anglers. Numerous charter fishing services also serve visitors.

Trinidad is a small community, but its population swells with visitors in the summer months. Because Eureka is only 23 miles distant, residents typically acquire a wide variety of goods and services in that community. Although the rate of unemployment in Trinidad is relatively low,

and relatively few persons are living in poverty, the PFMC & NMFS study (2006b) categorized the community as most vulnerable to detrimental changes in the region's marine fisheries. This finding derives from the fact that there is extensive local involvement in commercial and recreation fishing here, but with few economic alternatives should the industries falter.

Table 4-6 Select Socioeconomic and Geographic Factors: Trinidad

Factor	Description
Total Population	311 persons (up to 2,000 in summer)
Principal Forms of Economic Activity	Government; Retail; Trade, Transportation, and Utilities; Commercial Fishing; Agriculture; Tourism
Rate of Unemployment*	6.7 percent (vs. State of California: 13 percent)
Median Family Income**	\$50,919 (vs. State of California: \$61,154)
Person below Poverty Level	9 percent (vs. State of California: 13 percent)
Distance to Significant Population Centers	Eureka: 23 m; Fort Bragg: 156 m; Crescent City: 62 m
Level of Community Vulnerability/Resilience†	Most vulnerable: high level of dependence on commercial fishing; low level of resilience

Source: U. S. Census 2009; CDF&G 2007; Pomeroy et al. 2010; BEA 2009 *EDD unemployment rates for February 2010; ** Incomes in 2008 inflation-adjusted dollars ; † cf. PFMC & NMFS (2006b)

Shelter Cove Fleets, Fisheries, and Support Sector Businesses. Fieldwork indicates that three full-time and two part-time commercial fishermen reside in the Shelter Cove area. The principal fisheries are: salmon troll; Dungeness pot; rockfish hook-and-line; urchin dive; and lingcod hook-and-line. Fewer than five local fishermen tend to participate in the commercial salmon fishery when it is open. No processors or distributors/buyers serve the local fleet.

As depicted in Table 4-7 below, most Shelter Cove-based fishing activity occurs in state jurisdiction waters within a relatively short distance from the cove itself (see Map 4-1).³⁷ When allowable, salmon fishermen will typically troll in state and federal waters between about six miles north and ten miles south of the cove. Most vessels stay within about five miles offshore, except when captains pursue albacore during certain years. Crabbers typically set their gear in the nearshore zone between and just south of Delgado Canyon and just north of Whale Gulch. Non-resident crabbers occasionally access the grounds around Shelter Cove, but often set their gear in relatively deep waters.

Table 4-7 Important Use Areas and Range of Shelter Cove-Based Commercial Fishing Fleets

Fishery	Vessel Category	Important Use Areas and Range
Dungeness Crab	Small	Locally to 7 nm north to 5 nm south, primarily in state waters
Nearshore Rockfish	Small	Locally to 5 nm north to 7 nm south, primarily in state waters
Salmon	Small	Locally to 9 nm north to 12 nm south in state and federal waters

³⁷ Data representing hook-and-line rockfish fishing around Shelter Cove cannot be reported given confidentiality concerns among less than three local fishermen.

Shelter Cove is a small community located a considerable distance from any significant population center. Moreover, the rugged North Coast topography makes the trip to this area considerably more challenging than might be indicated by air distance alone. As such, the community tends to attract residents and visitors who appreciate the beauty and solitude of the mountainous coastal surroundings.

Locally available fishery-specific goods and services are limited. As such, the numerous recreational anglers who frequent the area during good weather tend to come well-prepared to fish and run their fishing vessels. Similarly, local commercial fishermen tend to be well-adapted to the geographic isolation of Shelter Cove. When trips are made for acquisition of fishery-related goods and services, Eureka is the typical destination. Seafood, especially crab and rockfish, is typically sold locally but may also be shipped to distant locations.

Table 4-8 Important Components of the Marine Fisheries Support Sector: Shelter Cove

Service or Product	Number	Description
Boat yard	0	--
Gear supplier	2	Located in Garberville (~45 minutes)
Welding shop	0	--
Marine electronics sales/service	0	--
Marine engine repair	0	--
Marine fabricator/machine shop	0	--
Vessel maintenance/repair and/or sales	0	--
Refrigeration specialist	0	--
Airport	1	Small airstrip for light, privately owned planes
RV park/campground	1	Often used by visiting recreational anglers
Charter fishing service	1-3	Attract numerous visiting anglers
Restaurants/hotel/motel	Numerous	Seasonally at full capacity, quiet in winter
Tackle shops/outfitters	1	Light tackle is available at the local campground
Processors/distributors/buyers	0	Absence of buyers said to constrain commercial activity
Harbors/marinas	1	Small public access facility with breakwater
Trips* (5-year average)	--	Data not available

*From Pomeroy et al. 2010

The history of Shelter Cove recreational and commercial fisheries indicates continual expansion and contraction in response to changing levels of abundance of key species and evolving regulations. Thus, while certain fisheries have faltered over time, the social capital and basic interest required to maintain local fisheries have persisted despite limited fisheries-specific physical and service infrastructure. For instance, it should be noted that during the course of this study, the West Coast salmon fisheries re-opened after three years of dormancy. Shelter Cove business owners who had previously expressed great concern about the future are now cautiously optimistic about resumption of a launch service, two prospective charter fishing operations, and prospective opening of a new restaurant.

However, as noted in Table 4-9 below, the aforementioned PFMC & NMFS study (2006b) determined that Shelter Cove should be categorized as “most vulnerable” to detrimental changes in the region’s commercial fisheries. That is, the authors determined a high level of dependence on commercial fishing coupled with a low level of resilience (i.e., a local/regional lack of economic alternatives). Of note, median household income is significantly lower than that of

households statewide, which may render particularly problematic any loss of jobs or income that follows from diminished commercial or recreational fishing activity.

Table 4-9 Select Socioeconomic and Geographic Factors: Shelter Cove

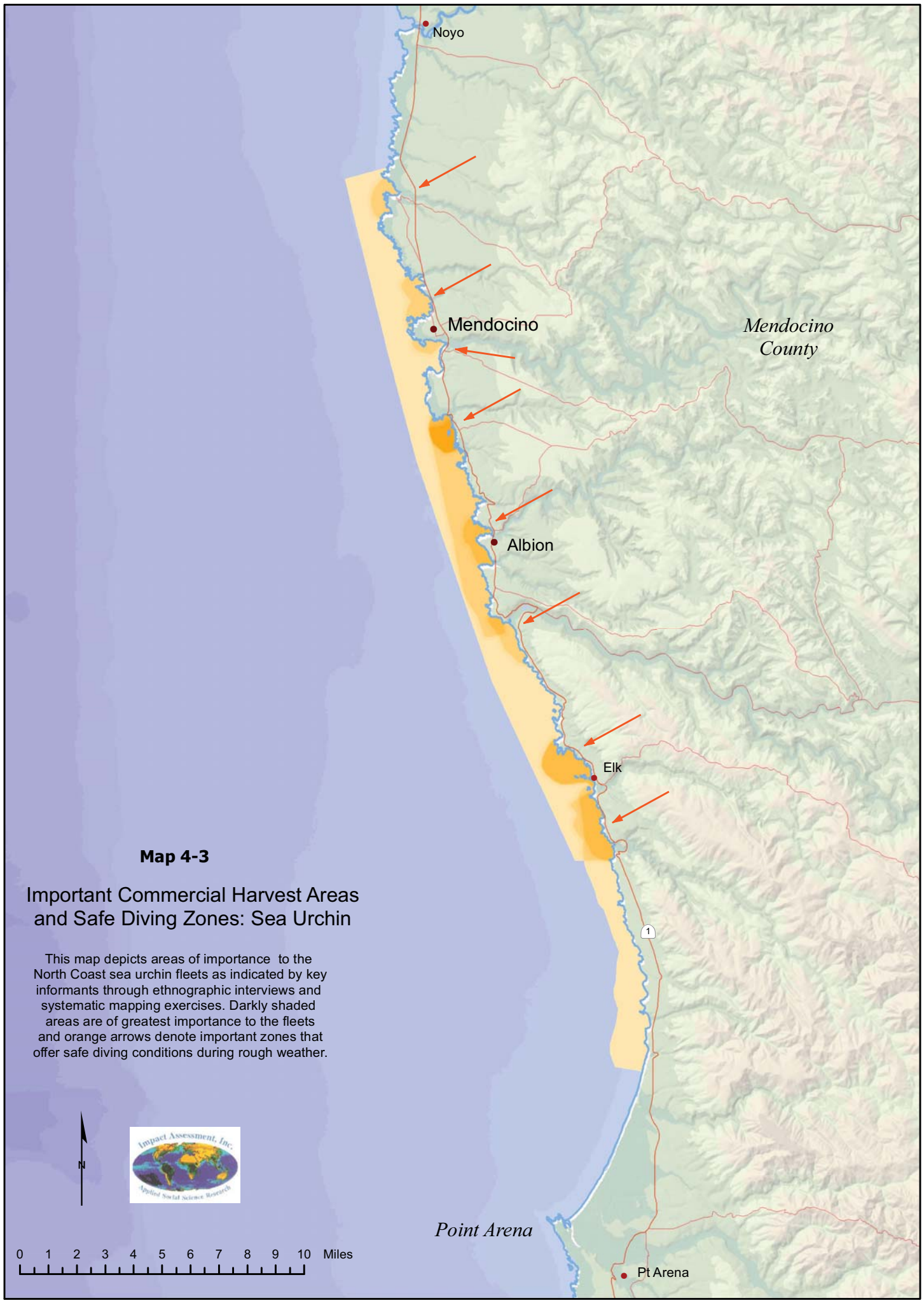
Factor	Description
Total Population	~500 persons; population expands to around 2,000 in summer
Principal Forms of Economic Activity	Government; Education and Health Services; Trade, Trans., and Utilities; Retail; Commercial Fishing; Construction; Tourism
Rate of Unemployment*	--
Median Family Income**	\$43,287 (vs. State of California: \$61,154)
Persons below Poverty Level	--
Distance to Significant Population Centers	Eureka: ~60 m; Crescent City: 172 m; Fort Bragg: 91 m; Challenging road conditions make for long drive times
Level of Community Vulnerability/Resilience†	Most Vulnerable: high level of dependence on commercial fishing; low level of resilience

Source: U. S. Census 2009; CDF&G 2007; Pomeroy et al. 2010; BEA 2009 *EDD unemployment rates for February 2010; ** Incomes in 2008 inflation-adjusted dollars ; † cf. PFMC & NMFS (2006b)

Fort Bragg/Noyo Harbor Fleets, Fisheries, and Support Sector Businesses. Fieldwork and review of archival data indicate that 60 to 80 licensed commercial fishermen live in the Fort Bragg/ Noyo Harbor area. The primary commercial fisheries conducted from Noyo Harbor are Dungeness crab pot; red sea urchin dive; groundfish trawl, hook-and-line, and trap; and salmon troll. Other fisheries of lesser or historic importance include the troll fishery for albacore tuna and the trawl fishery for ocean shrimp (Pomeroy et al. 2010b). Three processors and six buyers/distributors serve the local fleet.

The local commercial fleet is comprised of roughly seven trawlers, 30 to 40 salmon trollers, 15 to 20 multi-fishery vessels and about 10 to 15 urchin dive boats. As noted in the previous chapter, extensive public and private sector infrastructure is available to facilitate ocean access, vessel mooring, supply, maintenance, and other marine-related services. Local fishermen occasionally travel to Eureka (or San Francisco) to acquire specialized goods and services.

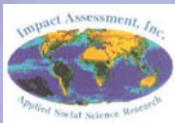
Table 4-10 below depicts the typical range and grounds of importance to locally based participants in the harvest sector. Most such fishermen here participate in multiple fisheries. Captains operating large vessels in the Dungeness fishery may travel to grounds as far as 100 miles north and 30 miles south, in both state and federal waters. Captains and crew of medium-sized crab vessels typically prioritize grounds as far north as 55 miles and as far south as 30 miles (see Map 4-1). Participants in the rockfish, salmon, and sea urchin fisheries typically travel anywhere from 25 to 35 miles north and 15 to 30 miles south to access productive nearshore and offshore zones (see Map 4-2, and Map 4-3 below). The Lost Coast region is renowned for halibut, lingcod, rockfish, tuna, and salmon fishing.



Map 4-3

**Important Commercial Harvest Areas
and Safe Diving Zones: Sea Urchin**

This map depicts areas of importance to the North Coast sea urchin fleets as indicated by key informants through ethnographic interviews and systematic mapping exercises. Darkly shaded areas are of greatest importance to the fleets and orange arrows denote important zones that offer safe diving conditions during rough weather.



0 1 2 3 4 5 6 7 8 9 10 Miles

Table 4-10 Important Use Areas and Range of Noyo-Based Commercial Fishing Fleets

Fishery	Vessel Category	Important Use Areas and Range
Dungeness Crab	Large	Locally to 100 nm north to 30 nm south and outside the study region in state and federal waters
	Medium	Locally to 55 nm north to 30 nm south in state and federal waters
Nearshore Rockfish	Small and Medium	Locally to 35 nm north to 15 nm south, primarily in state waters
Salmon	Medium	Locally to 25 nm north to 30 nm south and outside the study region, primarily in state waters
Sea Urchin	Small and Medium	Locally to 16 nm north to 21 nm south, primarily in state waters

As depicted in Table 4-11 below, a variety of fisheries-related goods and services are available in the Fort Bragg area. Of note, a Eureka-based business owner ships marine supplies to various Fort Bragg retail businesses on a weekly basis.

Although many North Coast fishermen are capable of various forms of repair work, Noyo-based fishermen included, local businesses are available for basic hull and engine repair and maintenance, welding services, electrical work, and so forth. It is often the case, however, that major refitting work on local vessels is undertaken in Eureka or in Coos Bay, Oregon.

The large vessel yard in Fort Bragg specializes in maintenance and repair of vessels involved in fisheries from Northern California to Alaska. The local small-boat yard provides space and support to fishermen who wish to work on engines and vessels themselves. This is a common situation since many fishermen in the region have been working on and around the ocean since early adulthood and have developed intimate familiarity with fishing vessels and vessel repair, among many other skills.

With regard to goods and services available to the recreational fleet, two local businesses service inboard engines; one undertakes fiberglass work. Three businesses specialize in marine goods, including bait and tackle. Three shops specialize in diving equipment; two of which also provide wetsuit rentals. Recreational fishing supplies can also be purchased at non-specialized outlets such as Rite Aid and Longs. Anglers report using catalogs and internet services to purchase some fishing and boating products. One Fort Bragg seafood buyer also owns and operates a dive shop and a fueling dock.

Table 4-11 Important Components of the Marine Fisheries Support Sector: Fort Bragg/Noyo Harbor

Service or Product	Number	Description
Boat yard	3	Numerous services provided. One yard caters to wooden vessels, one to large steel vessels, one to small vessels
Marine supplies	10	Numerous options for marine-related products
Welding shop	2	--
Marine electronics sales/service	3+	--
Marine engine repair	3+	--
Hull repair	2+	--
Marine fabricator/machine shop	1+	--
Commercial dive shop	2+	--
Marine refrigeration specialist	2	--
Airport	1	Privately owned
Charter service	5+	Active charter fleet
RV parks/campgrounds	8	Extensive seasonal use
Restaurant/hotel/motel	Numerous	--
Tackle shops/outfitters	Several	--
Seafood processors	2	Critical component of commercial service infrastructure
Seafood buyers/distributors	6	Critical component of commercial service infrastructure
Harbors/marinas	2	Serving commercial and recreational fleets
Trips* (5-year average)	3,097	Highly active commercial fleets
Miscellaneous	Numerous	Lumber, hardware, plumbing, auto supplies, paints, plastics, and industrial products

As noted in Table 4-12 below, socioeconomic conditions in Fort Bragg are similar to other North Coast communities. That is, median family income is significantly lower than the statewide average, and a high percentage of residents are living in conditions of poverty. At nearly 14 percent, the local rate of unemployment is also quite high. The PPMC & NMFS study (2006b) classified the community as most vulnerable to detrimental changes in the region's fisheries.

Table 4-12 Select Socioeconomic and Geographic Factors: Fort Bragg/Noyo Harbor

Factor	Description
Total Population	7,026 persons
Principal Forms of Economic Activity	Government; Education and Health Services; Trade, Trans., and Utilities; Retail; Commercial Fishing; Construction; Tourism
Rate of Unemployment*	13.9 percent (vs. State of California: 12.8 percent)
Median Family Income**	\$36,548 (vs. State of California: \$61,154)
Person below Poverty Level	20.4 percent of population (vs. State of California: 13 percent)
Distance to Significant Population Centers	Eureka: 133 m; Crescent City: 218 m
Level of Community Vulnerability/Resilience *	Most Vulnerable: high level of dependence on commercial fishing; low level of resilience

Source: U. S. Census 2009; CDF&G 2007; Pomeroy et al. 2010; BEA 2009 *EDD unemployment rates for February 2010; ** Incomes in 2008 inflation-adjusted dollars ; † cf. PPMC & NMFS (2006b)

Albion Fleets, Fisheries, and Support Sector Businesses. The primary commercial fisheries conducted from Albion are sea urchin dive; rockfish, cabezon, and greenling hook-and-line, and salmon troll. Red sea urchin is the principal commercial fishery at this small port. No processors are available to serve the local commercial fleet, but two buyers/distributors are located in the vicinity, and other buyers may serve the local fleet as landings and market conditions allow.

The local commercial fleet is comprised of about 23 vessels, including three salmon trollers, five nearshore hook-and-line vessels, eight urchin dive boats, and a variety of mixed-use vessels. Given recent closures, local salmon fishermen are increasingly exerting effort in the region's urchin, crab, and herring roe-on-kelp fisheries.

Table 4-13 depicts the typical range and grounds of importance to local commercial fishermen. Most Albion area fishermen harvest nearshore species in state waters, and tend to venture not much more than about 15 miles north or south of the harbor (see Maps 4-1 through 4-3). Vessels are typically in the 18- to 24-foot range. A few captains pursue salmon in federal jurisdiction waters. There is close affiliation between fishermen and other residents of Albion with Fort Bragg, which is some 17 miles distant.

Table 4-13 Important Use Areas and Range of Albion-Based Commercial Fishing Fleets

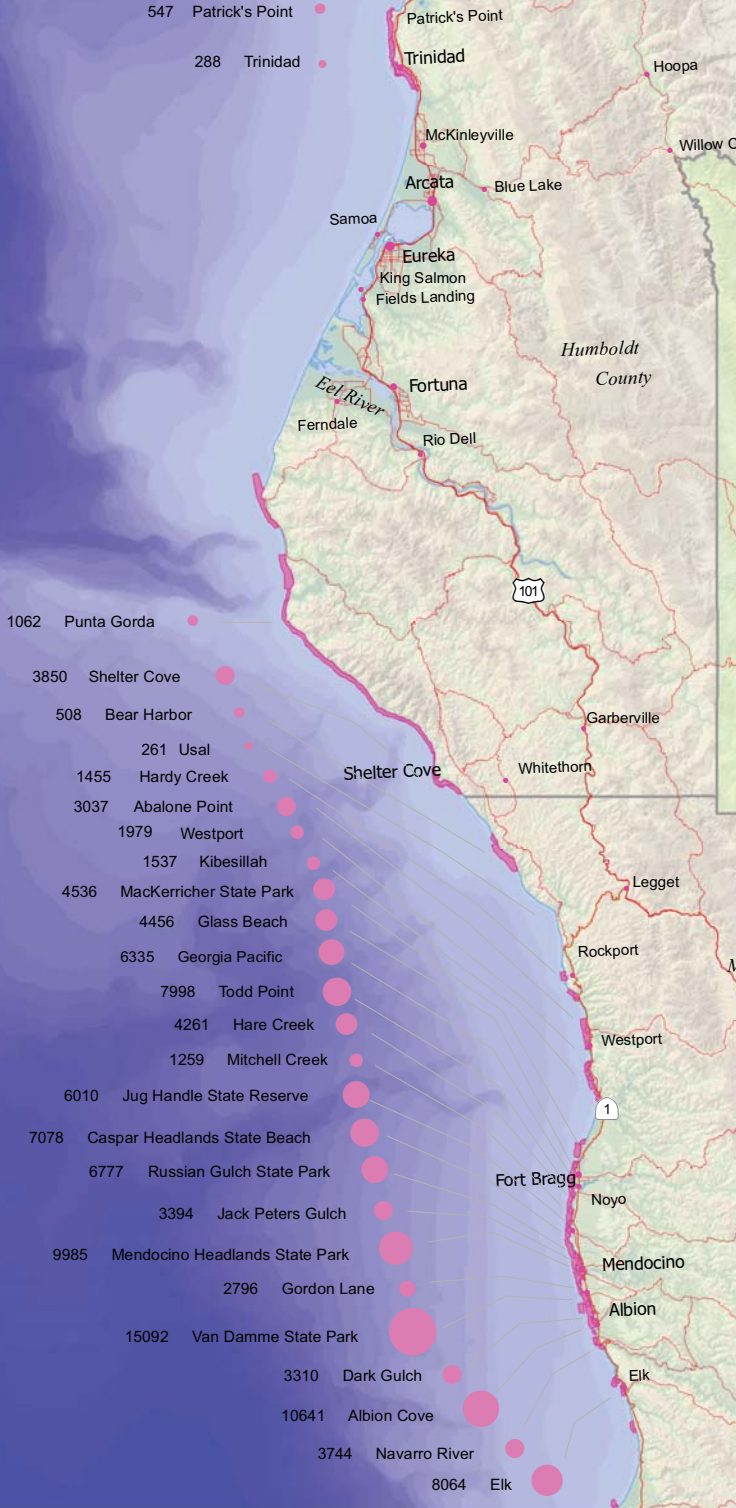
Fishery	Vessel Category	Important Use Area and Range
Sea Urchin	Small	Locally to 8 nm north and 7 nm south, primarily in state waters
Nearshore Rockfish	Small	Locally to 15 nm north and 15 nm south, primarily in state waters
Salmon	Small	Locally to 8 nm north and 15 nm south in state and federal waters

The commercial fishery support sector is somewhat limited in Albion. There are commercial and recreational docking facilities, launch ramps for small vessels, and vessel storage space. Most fishermen travel to Fort Bragg, for specialized marine services. Limited services are also available in Mendocino and Ukiah.

Owners of local campgrounds, hotels, and restaurants report operating at full capacity during the summer months, largely due to visiting abalone divers and recreational anglers (see Map 4-4). Such activity tends to start in April and begin to decline in November. Rental property owners advertise the proximity of Albion to recreational abalone grounds, and campground owners advertise the facilities and services they provide for recreational fishing and diving enthusiasts. Owners and operators of local restaurants and grocery stores report benefiting from seasonal population growth associated with recreational fishing and diving.

Important Recreational Use Areas Abalone (Dive and Shore Collection)

This map depicts areas of importance to North Coast recreational abalone harvesters as indicated by key informants through ethnographic interviews and systematic mapping exercises and from abalone report cards. Shaded areas are of importance to users. Figures represent six year averages (2002-2007) by report site, as provided by California Department of Fish and Game.



Map 4-4

Important Recreational Use Areas Rockfish (Boat Angling)

This map depicts areas of importance to North Coast recreational rockfish harvesters as indicated by key informants through ethnographic interviews and systematic mapping exercises. Darkly shaded areas are of greatest importance to users. Areas of effort outside of the 20 fathom RCA lines denote either past areas of importance or elevated pinnacles where fishing is permitted.

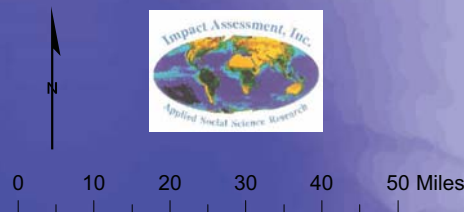


Table 4-14 Important Components of the Marine Fisheries Support Sector: Albion

Service or Product	Number	Description
Boat yard	0	--
Ship's store/gear supplier	0	--
Welding shop	0	--
Marine electronics sales/service	0	--
Marine engine repair	0	--
Marine fabricator/machine shop	0	--
Commercial dive shop	0	--
Marine refrigeration specialist	0	--
Airport	1	Located 2 miles away at Little River; public
Charter service	0	--
RV parks/campgrounds	2	Tend to serve recreational anglers on seasonal basis
Restaurant/hotel/motel/vacation rentals	Numerous	Extensive seasonal business from recreational anglers
Tackle shops/outfitters	0	--
Distributors and processors/buyers	2	Non-resident buyers may also come to Albion on occasion
Harbors/marinas	2	Small facilities for commercial and recreational vessels
Trips (5-year average)	--	Data not available
Miscellaneous	Numerous	Fishermen often purchase goods & services from area businesses that are not dedicated solely to fisheries support

As depicted in Table 4-15, Census data for Albion indicate a relatively low rate of unemployment and a relatively small percentage of persons living in poverty. Median household incomes are considerably lower than for the state as a whole, however, and the 2006 study conducted by PFMC and NMFS (PFMC & NMFS 2006b) determined that a high level of local dependence on fishing and few economic alternatives in the region rendered the community most vulnerable to detrimental changes in the region's fisheries.

Table 4-15 Select Socioeconomic and Geographic Factors: Albion

Factor	Description
Total Population	1,035
Principal Forms of Economic Activity	Education and Health Services; Tourism; Agriculture, Forestry, Fishing, and Hunting
Rate of Unemployment*	4.3 percent (vs. State of California: 13 percent)
Median Family Income**	\$40,491 (vs. State of California: \$61,154)
Person below Poverty Level	9.8 percent (vs. State of California: 13 percent)
Distance to Significant Population Centers	Eureka: 150 m; Crescent City: 235 m; Fort Bragg: 17 m
Level of Community Vulnerability/Resilience†	Most Vulnerable: high level of dependence on commercial fishing; low level of resilience

Source: U. S. Census 2009; CDF&G 2007; Pomeroy et al. 2010; BEA 2009 *EDD unemployment rates for February 2010; ** Incomes in 2008 inflation-adjusted dollars ; † cf. PFMC & NMFS (2006b)

Crescent City Fleets, Fisheries, and Support Sector Businesses. Fieldwork and review of archival data indicate that about 120 commercial fishermen are active in the Crescent City area. The principal commercial fisheries conducted from Crescent City are: Dungeness crab pot fishery; groundfish trawl; hook-and-line and trap; pink shrimp trawl; Pacific whiting trawl; and troll fisheries for salmon and albacore (Pomeroy et al. 2010). The resident fleet includes: five trawlers, 12 nearshore hook and line vessels, and about 100 crab/troll vessels. Most area fishermen are involved in multiple fisheries.

Table 4-16 depicts the typical range and grounds of importance to local commercial fleets. Captains of large crab vessel often travel as far as 50 miles south and 20 miles north in state and federal waters. Captains of small- and medium-sized vessels tend to stay within 10 to 12 miles north or south of the harbor, primarily in state waters. Participants target nearshore species including rockfish, sea urchin, shrimp, and abalone (Maps 4-1 through 4-3, and Map 4-5 below).

Table 4-16 Important Use Areas and Range of Crescent City-Based Commercial Fishing Fleets

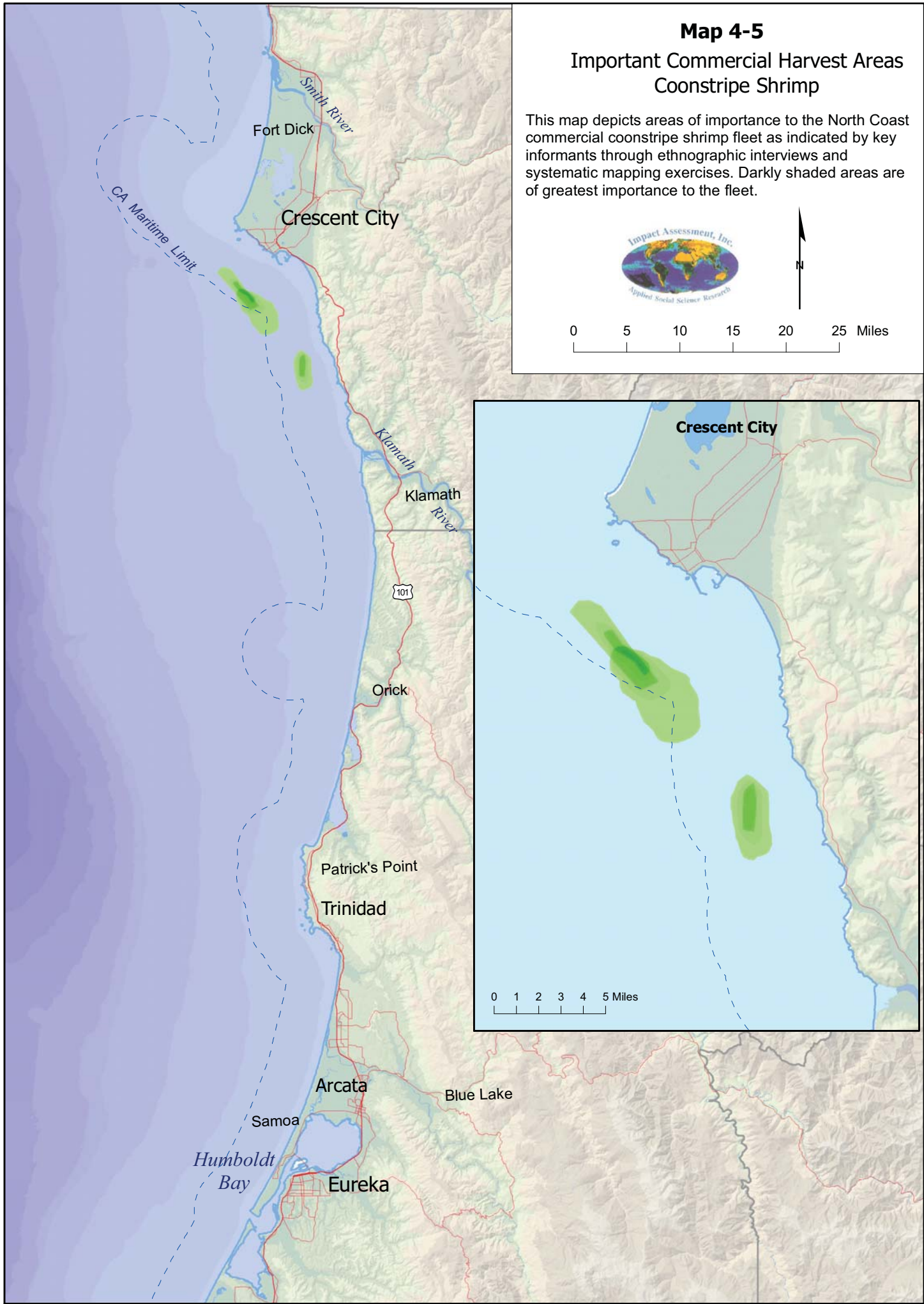
Fishery	Vessel Category	Important Use Area and Range
Dungeness Crab	Large	Locally to 20 nautical miles (nm) north to 50 nm south of harbor and outside of study region in state and federal waters
	Small and Medium	Locally to 10 nm north-northwest to 12 nm south, primarily in state waters
Nearshore Rockfish	Small	Locally to 8 nm miles north-northwest to 12 nm south, primarily in state waters
Coonstripe Shrimp	Small and Medium	Locally to 3 nm west to 8 nm south, primarily in state waters

Crescent City-based commercial fleets have tended to be both active and productive over the years, requiring an extensive support sector. Of particular importance today are the local processor and the six buyers who serve the fleet (Pomeroy et al. 2010). Some of the buyers say that it can be difficult to meet market demand because of: increasing overhead costs, limited economies of scale,³⁸ regulatory constraints on the fleets, and attrition of certain commercial fleets due to the aging out of captains and lack of replacement with younger fishermen. Of note, the 2009 salmon season which limited recreational fishing to the KMZ reportedly was profitable for many businesses in Crescent City.

A number of local captains of small- to medium-sized vessels are now selling high-value coonstripe shrimp to two specialized buyers who, in turn, distribute to markets in the San Francisco Bay area. A small contingent of local fishermen sells albacore, shrimp, and rockfish directly to retailers, restaurants, and consumers in the Crescent City area.

Some service sector business owners report challenges associated with competition from Oregon business owners who pay lower worker's compensation rates and who attract business from local fishermen who pay no sales tax in Oregon. But many small-vessel operators interviewed in Crescent City tended to express satisfaction with the local availability of fisheries goods and services. Some large-vessel captains report that certain mechanical and machine services can be difficult to acquire locally, and that reasonably priced boat yard facilities could improve the efficiency of their operations. Currently, there is some reliance on such services as available at publically funded yards in Eureka and Alaska.

³⁸ Certain factors cause a buyer's overhead costs to fall as the scale of output is increased. But in a relatively small and competitive local market, expansion can be hard to obtain.



Public funds have recently become available for improvements to marine infrastructure in Crescent City. A total of \$4.2 million in federal funds has been allocated for dredging, and \$685,000 has been acquired through the California Coastal Conservancy to develop a new master plan for the harbor. Costs for repairs required after the 2010 tsunami were addressed by the California Emergency Management Agency.

At least four local businesses support recreational fishing in the Crescent City area. Recreational fishing supplies can also be purchased at non-specialized outlets. Respondents noted that small motorized boats and high quality kayaks were not currently available in the area.

Table 4-17 Important Components of the Marine Fisheries Support Sector: Crescent City

Service or Product	Number	Description
Boat yard	1	Conversions, Repair, New Construction, Fishing Boats, and Work Boats
Ship's store/gear supplier	1	Provides for a variety of fishing gear and vessel needs
Welding shop	1	--
Marine electronics sales/service	1	Basic VHF, fish finders, GPS, etc.
Engine and equipment repair	2	Basic maintenance and repair
Marine fabricator/machine shop	1	--
Vessel maintenance/repair and/or sales	9	Seven commercial; two recreational
Marine refrigeration specialist	1	Critical for commercial fleet
Airport	1	Jack McNamara Field; Public
Dive equipment sales/lessons	1	Often accommodate abalone divers
Charter fishing service	2	Variety of trips and species
RV parks/campgrounds	2	Often accommodate recreational anglers
Restaurants/hotel/motel	7	Numerous restaurants; seven hotels/motels
Tackle shops/outfitters	Numerous	Basic tackle needs, bait, etc.
Distributors and processors/buyers	7	One buyer/processor; six buyers
Harbors/marinas	1	Large, highly active public harbor
Trips* (5-year average)	3,044	Very active local fleets
Miscellaneous	Numerous	Lumber, hardware, plumbing, auto supplies, paints, plastics, and industrial products

As depicted in Table 4-18 below, the rate of unemployment percentage of persons living in poverty are quite high in the Crescent City area. Moreover, median incomes are well below half the statewide average. The 2006 study conducted by PFMC and NMFS (PFMC & NMFS 2006b) determined that a high level of local dependence on fishing and few economic alternatives in the region rendered the community vulnerable to any detrimental changes in the region's fisheries. Fishery-related business owners in Crescent City relate their own economic challenges to a lack of capital and disposable income among residents who might otherwise invest in their vessels and gear, a situation they see as compounded by the recent national economic crisis. Some small business owners in Crescent City report losing customers to Oregon, where they do not have to pay sales tax.

Table 4-18 Select Socioeconomic and Geographic Factors: Crescent City

Factor	Description
Total Population	4,006
Principal Forms of Economic Activity	Government; Retail; Trade, Transportation, and Utilities; Commercial Fishing; Agriculture; Tourism
Rate of Unemployment*	17.1 percent (vs. State of California: 13 percent)
Median Family Income**	\$25,783 (vs. State of California: \$61,154)
Person below Poverty Level	34.6 percent (vs. State of California: 13 percent)
Distance to Significant Population Centers	Eureka: 84 m; Fort Bragg: 218 m
Level of Community Vulnerability/Resilience†	Vulnerable: high level of dependence on commercial fishing; low level of resilience

Source: U. S. Census 2009; CDF&G 2007; Pomeroy et al. 2010; BEA 2009 *EDD unemployment rates for February 2010; ** Incomes in 2008 inflation-adjusted dollars ; † cf. PFMC & NMFS (2006b)

4.3 Synthesis of Key Processes and Issues

Patterns of Seafood Distribution. Transfer of seafood - from the ocean to the fisherman to the end consumer - frequently involves many intermediate buyers and sellers; extensive processing and packaging work; and extensive chilled transportation via fishing vessels, trucks, container vessels, small airplanes, jets, and so forth. Each step in the distribution process adds cost to the consumer and generates revenue for the community of persons involved in the fishery in question. In many cases locally landed seafood is eventually transferred to national and global markets, directing any further multiplying effects outside the originating port community. In other cases, the transfer is more simplistic, and some part of the catch almost invariably remains in the port community where it may be: sold to a buyer or processor; shared in family, extended family, neighborhood, fleet, and community settings; or consumed directly by the fisherman and family.

The purpose of documenting patterns of seafood distribution in the study region is to enable planners to anticipate the potential changes that might occur as a result of establishing any given MPA or array of MPAs in the region. From a systems perspective, seafood distribution can be envisioned in terms of the number of pathways or vectors available to a given fishing operation, and in terms of the importance of a particular vector or vectors to a certain business, group of businesses, and the fishing-oriented community as a whole. Closing areas of the ocean to commercial fishing activities has the potential to constrain, redistribute, or stop the flow of seafood and associated revenue through channels that were established based on historical productivity of certain fishing grounds, with potentially far-reaching economic and social consequences. Similarly, closing areas of the ocean to recreational fishing activities has the potential to alter the distribution and/or degree of purchase and use of local recreational fishing support goods and services. The situation calls for detailed attention to the social and economic interactions that enable functioning marine fisheries.

Channels of seafood distribution vary based on local infrastructure and service capacity, the species in question and associated storage and preservation requirements, and decisions made by the owner of the product at any given stage in the process. Understanding the sequence of linkages and requirements for distributing a perishable marine resource can be complicated since a single person or a multi-faceted business entity can undertake one or many roles in the process.

For instance, one fisherman may deliver the catch directly to the public or to local retailers and restaurants, while another may sell to a receiver or offloader who, in turn, may up the price and sell to processors or wholesalers. Some fishermen operate receiving stations used by other fishermen, often for a fee. It should be noted that some species are sold for bait used in both commercial and recreational fishing. Typical distribution roles include: fisherman/distributor; receiver/buyer; buyer/processor; processor/wholesaler; wholesaler/distributor, retailer. Such marketing options and seafood distribution pathways tend to vary across the study region. For instance, as depicted below, the straightforward situation at Shelter Cove is quite unlike that in Eureka, where multiple forms of distribution have been documented during the course of this study.³⁹

Shelter Cove

Fisherman → Direct Sale to Consumer

Fisherman → Retailer, Grocer, Restaurateur → Consumer

Eureka

Fisherman → Direct Sale to Consumer

Fisherman → Retailer, Grocer, Restaurateur → Consumer

Fisherman → Processor → Wholesaler → Retailer, Grocer, Restaurateur → Consumer

Fisherman → Receiver → Wholesaler → Retailer, Grocer, Restaurateur → Consumer

Fisherman → Buyer/Processor → Wholesaler → Retailer, Grocer, Restaurateur → Consumer

Diversification and Specialization in the Support Sector. North Coast processors, buyers, distributors, and marine goods and service providers typically discuss a variety of contemporary challenges. These include: the economic effects of closed and/or time-limited commercial and recreational salmon seasons; the rising costs of acquiring marketable goods from distant markets; the pervasive effects of the national and international economic crisis; a putative lack of skilled labor in the marine fabrication sector; strict OSHA and EPA rules regarding use and disposal of fiberglass, resins, and epoxies; and competition from out-of-state businesses. Some informants asserted that salmon disaster relief funds have helped stabilize the industry and the regional economy as a whole.

Some support sector businesses specialize in certain products and services, while others may be relatively more diversified. Some such businesses are small family-owned operations with a single facility, while others are corporation-owned businesses with multiple locations. Such variability is a significant consideration for MLPA assessment and planning purposes, since diversification of services and locations can buffer the detrimental effects of area-specific fishing closures, and because businesses providing specialized goods or services and businesses located in a single location may potentially be particularly vulnerable to closure of adjacent fishing grounds.⁴⁰ It should be noted that loss of marketing options can significantly affect a given fleet

³⁹ See also Pomeroy et al. (2009a; 2009b; 2010a; and 2010b) for pathways of seafood distribution in the region.

⁴⁰ For instance, varying weather and sea conditions, changes in the distribution and abundance of the targeted species, and area-specific fishing regulations can prevent market demand from being met by fishermen in a single harbor. Thus, some buyer/processors benefit by maintaining receiving stations in multiple locations.

or fishing community. For example, the shark fishery conducted in Humboldt Bay is no longer a viable fishery due to loss of local buyers.

Key informants in the study region enumerated some 25 particularly important (nodal) businesses engaged in the purchase, processing, and distribution of seafood in the region. These and other commercial fisheries support sector businesses are depicted in Map 4-5 below. Although not of equal size or capacity, each buyer/processor/distributor was deemed an important vector for sale and distribution of seafood in, across, and outside the North Coast region. In terms of diversification of services/products and locations, these businesses were perceived to fall within a continuum between two extremes.

At one end of the continuum, five major North Coast receiver/buyer/processors are known to serve more than one North Coast port community and/or major ports outside of the study region. Each is involved in multiple state and federal water fisheries, and each distributes to other firms across the region, nation, and globe. At the other end of the continuum, one receiver/buyer/processor serves only one major North Coast port and only one fishery, which is caught solely in state waters. Within the continuum, three businesses serve one port for one species; two serve more than one major port and focus on high value live market products only; and numerous seafood businesses are fairly diversified in terms of fisheries, but operate only in a single community.












Constraining and Enabling Factors, and Interaction between Commercial Sectors. A variety of factors currently render North Coast seafood processing and distribution firms vulnerable to changes in the harvest sector, and the harvest sector itself is subject to a variety of challenges and forces of change. Again, such factors are important in MLPA assessment and planning processes since the current status of a given fishery is in total always conditioned by historic and contemporary changes in: (a) the marine and regulatory environments; (b) technology associated with navigation, fish-finding, fishing, and seafood processing; (c) the marketplace; (d) the demography of participants in the harvest sector; (e) fixed and trip costs; and (f) processing and transportation costs, among other factors.

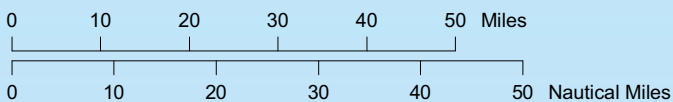
Regulatory Factors. Participants in the various sectors of the North Coast commercial fishing industry repeatedly mention that the physical and service infrastructure associated with seafood processing and distribution has been significantly affected by a long series of regulatory changes. Most business owners discuss regulatory changes in the salmon, groundfish, albacore, and shrimp fisheries. In some cases, harvest sector regulations have led to the departure of buying and processing facilities from the region. Concerns have been raised about the future of the region's fisheries support sectors, largely in association with the potentially constraining effects of prospective new quotas and by-catch rules associated with an IFQ system for groundfish, and pot limits for the Dungeness fishery.

Map 4-6

Commercial Fishing Support Sector

This map depicts area businesses of importance to the North Coast commercial fishing fleets as indicated by key informants through ethnographic interviews. The category of vessel maintenance and repair includes businesses that provide essential goods and/or services related to electrical, navigational, hydraulic, engine, and refrigeration systems in addition to hull and rigging structures.

-  Marina/Pier/Boat Launch Facility
-  Fuel Dock
-  Receiver
-  Buyer
-  Buyer/Processor
-  Retailer
-  Ice Facility
-  Vessel Maintenance & Repair
-  Boat Yard
-  Gear, Bait & Dive Supplier
-  General Supplies



Crescent City

Del Norte County

Siskiyou County

Trinidad

Arcata

Eureka

Fortuna

Rio Dell

Humboldt County

Shelter Cove

Mendocino County

Fort Bragg

Mendocino

Albion

Philo

Ukiah

Sonoma County

Lake County

Yolo County

Trinity County

Shasta County

Trinity County

Tehama County

Glenn County

(various)

S (various)

G G G S (various)

G G G G S (various)

It should be noted that a large percentage of North Coast fishing grounds are, at some point during the year, closed to pursuit of certain species or to use of certain types of gear. Particularly important regulations affecting North Coast fleets and support sector businesses are depicted in Table 4-19 below. Because most closures involve a temporal aspect, both season and affected area are provided in the table.

Table 4-19 Key Regulations Affecting Commercial Fishing Operations along the North Coast

Species/Gear Type	(Open) Season	Closed Areas
Coonstripe Shrimp	Open May 1st to October 31 st	--
Dungeness Crab	Open December 1st to July 15th	Crabs harvested from one mile radius of Eel River, Humboldt Bay, and Trinidad Bay may not be sold
Nearshore Rockfish Complex (hook-and-line) and Lingcod (limited entry and open access)	(Rockfish) Open May through February south of 40°10' ; open all year round north of 40°10' (Lingcod) Open May through November	Closed 30-150 fathoms south of 40°10' and 20-100 fathoms north of 40°10'
Salmon	Regulations regarding seasons depend upon the status of the resources and vary by area with KMZ generally being more restricted. The commercial season for the whole coast was closed in 2008 and 2009.	
Sea Urchin	Open seven days per week from November through May, and Monday through Thursday from June through October.	Point Cabrillo State Marine Conservation Area

Regulations can tend to redistribute fishing effort and lead to a reordering of existing systems of fisheries-related social and economic interaction. For instance, key persons in the harvest sector report that spatially designated rockfish quotas have forced some fishermen to change harbors, and that salmon, nearshore rockfish, and trawling regulations have displaced fishing effort into various crab grounds, leading to interaction between fleets that were formerly not as likely to interact on the ocean. Notably, KMZ-specific salmon bag limits now encourage fishermen to offload on a daily basis, thereby restricting their range to within a day's voyage from port. Destination and range have also been affected by regulations that preclude delivery to a specific port if that port is located in a closed area. Further, because participation in the federal waters groundfish fisheries requires use of observers and/or vessel monitoring systems (VMS), some fishermen are opting to fish only in state waters when targeting rockfish and/or are participating only in federal water fisheries other than groundfish.

For fishermen who participate in both crab and the groundfish trawl fishery, decisions regarding where to fish are based largely on allowable/available quota and price per pound. Quota availability and prices permitting, the trawl fishery is often said to be relatively more stable and dependable than the crab fishery. This perspective is captured in the comment of a key fisherman in Eureka who said that when the [petrale sole] quota is good, it is like a "bird in the hand," whereas finding crab can be a "guessing game." However, the fisherman added that the future may hold challenges, believing that pending establishment of an Individual Fishing Quota (IFQ) system will make the crab fishery more competitive.

Commercial urchin divers and kelp harvesters in northern Mendocino County assert that there has been some displacement of effort arising from establishment of MPAs in southern portions of the county and in Sonoma and Marin Counties. Displacement of effort is also said to be occurring amongst recreational abalone divers. The situation has given rise to concerns about possible overharvesting and may be instructive of the potential future ecosystem effects of MPAs along the North Coast and elsewhere in the larger region.

The sum effect of historic changes, especially regulatory changes, has been a significant level of attrition of commercial fishing fleets across the North Coast. Commercial fishermen frequently note that diminishing fleet size and hence diminishing levels of catch and effort have resulted in fewer buyers and processors in the region, and consolidation of many remaining businesses. Consolidation also occurs in part from pressures and challenges within the support sector itself. For instance, market challenges associated with an influx of seafood harvested outside the U.S., and increasing processor licensing fees, waterfront leasing costs, and shipping fees are but a few of the economic challenges confronting the processing and distribution sector. Some informants asserted that, as is the case in the harvest sector, numerous business owners and operators in the processing and distribution sectors were also aging out of the industry without replacement, thereby furthering loss of small seafood businesses in the region.

Consolidation tends to reduce the number of distribution vectors and options for participants in the harvest sector, thereby creating critical nodal relationships that are not always optimal for fishermen and that in some cases may render a given fishery vulnerable to further challenges. The prospective effects of MPA-related closures will need to be addressed with due consideration of this historic and contemporary context – especially since such effects may involve further constraints on the spatial distribution of effort and level of production in the harvest sector, and hence the viability of support sector businesses across the region.

Numerous Social and Economic Linkages. Part of the MPA assessment context is the backward and forward nature of linkages between the harvest, processing/distribution, and support sectors. That is, each sector is mutually dependent on the viability of the other, and by extension the status of the entire system can affect social and economic aspects of life in the host communities and region as a whole.

Commercial and recreational fishermen require many products and services. These vary depending on target species, gear and vessel requirements, and other factors. Because seafood is highly valued, fishermen also *provide* an important service. Socioeconomic relationships involving fisheries goods and services can be extensive and complex, even for a single fisherman in a small community.

The following illustration is intended to represent the basic extent of documented linkages between an Albion-based commercial fisherman and various support sector goods and service providers with whom he interacts in Albion and elsewhere along the North Coast. By multiplying linkages identified in this and more complex schematics across the Albion fleet it would be possible to begin to approximate the actual complexity and extent of fishery-specific linkages in this rural area. Identifying the key components, vectors, linkages, and relationships

involved in nearshore North Coast fisheries is a central objective of this project, and a requisite for effective assessment of the full range of effects of the MLPA process along the North Coast.

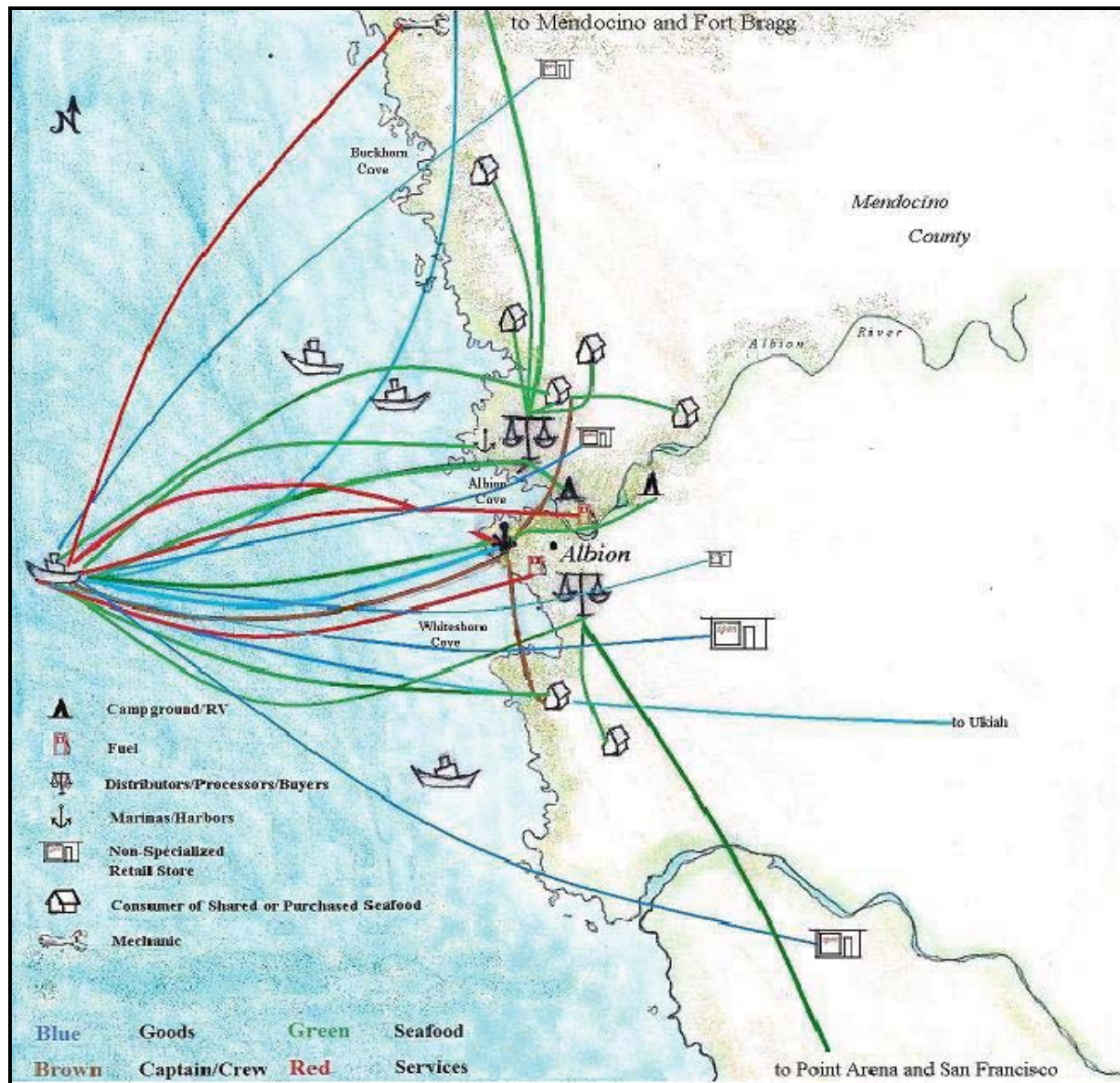


Figure 4-1 Known Social and Economic Linkages between an Albion-based Commercial Fisherman and the Shoreside Seafood Processing, Distribution, and Support Sectors

Important Cost Categories and Economic Considerations. This study and similar work conducted by IAI along the Central Coast (IAI 2010) makes clear that active commercial fishermen tend to prioritize certain economic factors and issues when discussing their fishing operations. An emphasis is often placed on the following: (a) fuel costs, (b) vessel and engine purchase and maintenance costs; (c) crew costs; (d) the availability and/or abundance of various marine resources and current pricing factors; (e) optional fishing strategies and fisheries; and (f) side jobs and alternative forms of employment.

With regard to cost factors, California gas and diesel prices have been particularly challenging in recent years, and very typically a principal consideration in one's fishing strategy. For instance, participants in the North Coast nearshore rockfish fisheries unavoidably operate on tight budgets.

Thus, as long as fish are present, most captains will operate as close to port as possible. Indeed, if resources are abundant near port, small vessels can be advantageous in that they are relatively cheap to purchase, operate, and maintain. Certain North Coast small boat fisheries have developed in keeping with this principle. This too is a significant MLPA planning consideration since certain nearshore areas amenable to small boat fishing will ultimately become off-limits.

There are other ways to save money. For instance, certain operators of large crab vessels typically crab only during the first four to eight weeks of the season and engage in lucrative federal water fishery options later in the year. For crabbers who do participate in the late season inshore Dungeness fishery, decisions to do so are typically based on calculations regarding: probable rate of pot loss; intra- and inter-fleet reports about the abundance of crab; crew costs; fuel costs; and current prices being paid for crab. One seasoned crabber summarized the basic economic principal of work in the harvest sector, stating that "every crabber has to calculate his own breaking point as to when it no longer pays to be out crabbing."

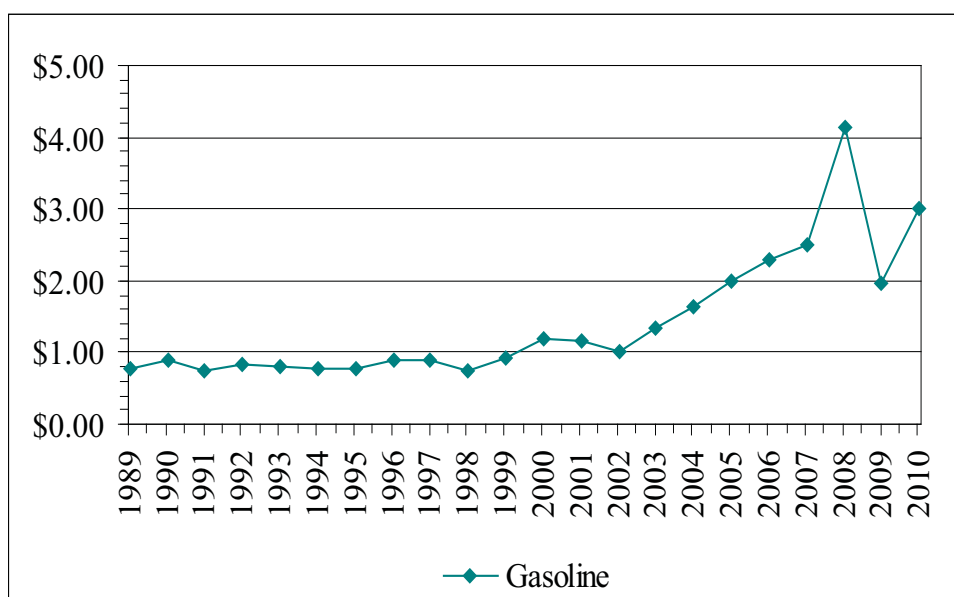


Figure 4-2 Recent Trends in California at-the-Pump Gas Prices

It is an important if unfortunate fact that the marine environment is highly corrosive. Thus, fishing and crabbing are particularly hard on gear, and plying the ocean is particularly hard on vessels and engines. As such, fishermen must continually maintain their equipment, and purchases of new fishing gear and vessel components are ongoing. Minimum support sector requirements are said to include: a marine supply store, a fabricator, a welder, a mechanic, an electrician, a refrigeration specialist, a woodworker, a fiberglass worker, and haul-out facilities.

As depicted in Table 4-20 below, recent survey-based economic research conducted by Hackett et al. (2009) estimates fixed and variable costs for commercial fisheries conducted from ports in

Del Norte, Humboldt, and Mendocino Counties. The results are useful in that they rank costs by fishery, and provide an inventory of typical variable and fixed costs by fishery.

Table 4-20 Total Annual Costs for Commercial Fleets Operating in the North Coast Region

Occupational Configuration	Fixed Costs	Variable Costs	Total Cost
Dungeness Crab– Medium & Large Vessels	5,798,289	5,590,307	11,388,596
Trawl	701,997	2,087,711	2,789,708
Salmon & Dungeness Crab – Medium & Large Vessels	1,236,866	855,733	2,092,599
Salmon	648,720	356,049	1,004,770
Nearshore and Groundfish Trap	466,918	371,906	838,824
Dungeness Crab – Small Vessels	164,043	512,210	676,253
Longline	354,868	181,424	527,293
Sea Urchin	300,923	202,887	503,811
Hook-and-Line (live)	295,453	198,612	494,064
Hook-and-Line	208,089	169,596	377,685
Salmon and Albacore	145,021	94,886	239,907
Prawn Trap	79,819	36,372	116,191
All Other	47,938	67,028	114,966
Total	10,439,945	10,724,723	21,164,668

Common fixed cost categories include: engine purchase and repair; electrical gear purchase and repair; hull purchase and repair; fishing gear purchase and repair; vessel insurance; storage; interest on payments; federal and state taxes; boat registration, permit, and commercial license fees; and home and transient slip fees. Variable or trip cost categories include: bait, crew wages, food, fuel, harbor, ice, transportation, association membership fees, and landing taxes. Each of the cost categories may potentially be subject to increases or decreases as a result of any new fishing regulations in the study area, including area-specific regulations associated with new marine reserves.

Finding and keeping crew is a common topic of discussion among participants in the North Coast crab fishery. Other nearshore fisheries also require the ongoing assistance of crew, but to a lesser extent. Youthful crew members are reportedly hard to keep employed due to the seasonality of many fisheries and the availability of state unemployment benefits which for some can offset the need to work on a consistent basis.

Fishing and the Challenges of Weather, Sea, and Oceanographic Conditions. Weather, sea, and oceanographic factors and conditions are particularly important aspects of fishing across the world's oceans. Environmental conditions can significantly affect patterns of use of California's nearshore marine ecosystems, and this is certainly the case along the North Coast, which is exposed to some of the most powerful storms and swells on the planet. The description is intended to further understanding of the complex nature of the region's marine fisheries and the factors which influence captains' decisions to use or avoid certain ocean areas during certain periods of times when conditions are not optimal.

Weather and sea conditions are an immediate and profound planning consideration for any fishing trip. Seasoned captains with sturdy commercial vessels and reliable engines are more likely to engage and persist in challenging conditions than the average recreational captain. But for many days of the year along the rugged North Coast, even the most experienced and well-equipped captains will stay at port. This constraint can have a profound effect on production,

especially since the allowable number of fishing days is often limited to a certain number of days per season or by available quota. Thus, weather and sea conditions can effectively shorten a regulatory season, as is the case, for example, in the commercial hook-and-line rockfish fishery. Avid participants in this fishery and in the nearshore charter fishery estimate that some 25 to 30 percent of allowable fishing days are lost to poor weather and sea conditions. Persons knowledgeable of the area's recreational fisheries, estimate that as many as 40 to 50 percent of the open seasons are lost to poor conditions. Viable seasons for kayakers, divers, and persons who gather in the inter-tidal zone are in effect even shorter seasons given ongoing requirements for calm conditions.

The interaction between wind and wind-influenced sea surface conditions, swell conditions, tide, fog, and orthographic and bathymetric features significantly influence the decision-making processes of North Coast fishermen. Large swells and certain tidal stages can make launching or exiting and entrancing harbors especially difficult, particularly in areas of maximum exposure to the west and northwest (and southwest during southwest swell events). For instance, tidal conditions interacting with swells and winds can make launching at Shelter Cove and exiting and entering Albion Harbor and Humboldt Bay quite difficult, often resulting in cancelled or shortened fishing trips.

Such factors can also lead fishermen to find sheltered areas in which to access the ocean and fish during challenging sea and weather conditions. For example, key informants report that recreational fishermen will often travel from Brookings, Oregon to fish from Crescent City during the winter months, since Crescent City Harbor is relatively well-protected from the west. Similarly, some large commercial crab vessel captains avoid the seasonal travails of entering and exiting Noyo Harbor by mooring in Eureka, and captains of small sea urchin vessels working from Albion typically plan their activities around the challenges of re-entering the harbor.

Small-vessel captains often discuss strategies for adapting to seasonal changes in weather and sea states. In the Crescent City area, many small-boat captains prefer fishing in the lee of Point St. George during certain times of the year. In the Fort Bragg area, sea urchin divers, who typically dive close to shore, seek areas protected from winter southerlies and spring northwesterlies. Eureka-area fishermen note that by the afternoon hours, wind and chop are commonly at their worst between Eel River and Steamboat Rock, or about 10 to 25 nautical miles south of the entrance to Humboldt Bay. This area is often best avoided by small vessels. In the Fort Bragg area, salmon trollers note the relief from confused seas that is often found at Usal Bight.

Such considerations are critically important in the MLPA planning process. Placement of MPAs has the potential to redirect typical patterns of use, including use of coastal features for purposes of protection from dangerous sea and weather conditions.

The act of fishing and setting pots should also be considered in terms of the effects of weather and sea conditions. For instance, big storms can further the tendency of crab pots and lines to entangle. Pots can also drift into and mire in muddy areas and kelp beds, often requiring time-consuming and dangerous effort to rectify. For recreational and commercial divers, winter

swells often necessitate moving away from the shoreline to avoid surge and swells. Visibility can also be limited during storm and swell events.

Clearly, changing oceanographic conditions also affect fishing and crabbing and the strategies and decisions of participants in the various fleets. Species abundance and the distribution of availability and abundance fluctuate in ways that are not readily predictable. For example, crabbers often assert that crab hot spots shift from year to year and even within a given season. Likewise, the location of salmon tends to vary during and between seasons. Location of quality sea urchins also tends to vary, depending in part on the variable quality of kelp.

Important Dimensions of the Recreational Sector. Extensive revenue is generated by non-resident recreational fishermen who travel to and stay in North Coast communities to engage in often costly fishing, crabbing, and diving activities. Indeed, from an economic perspective, just as revenue flows through a system of harvesters, buyers, processors, distributors, and commercial fishing support sector businesses, so it also flows through a system of anglers and recreational fishing support sector businesses. Basic components of the North Coast recreational fisheries support sector are depicted in Map 4-6 below.

Much recreational fishing activity is seasonal in nature, and in the warmer, calmer months, North Coast campgrounds, RV parks, and local hotels are often booked to capacity, with many anglers and their families also patronizing local restaurants, stores, gas stations, and laundry services. Charter fishing operations are also widely patronized during good weather months.

Owners of charter operations must address the full range of fixed and trip costs, with many expenditures relating to maintenance of vessels, gear, and crew, and to the safety and enjoyment of the patrons. Charter fishing straddles the commercial and recreational fishing industries and in many ways constitutes its own form of industry.

Pendelton and Rooke (2006) compare recreational fishing expenditures for charter patrons and private boat anglers in California. Average daily expenditures for charter patrons in Northern California were \$128 for residents and \$374 for non-residents. Average daily expenditures for resident and non-resident anglers using their own vessels were \$50 and \$198, respectively (Pendelton and Rooke 2006:12).

A variety of trip-related expenses are incurred when fishing from privately owned recreational vessels. These include: travel to the harbor; food; fuel for the vessel; launching fees where applicable; various fishing gear; bait; and ice. There are also numerous durable goods costs, such as: the fishing vessel; one or more engines; vessel necessities such as anchor, mooring lines, running lights, and safety equipment; marine electronics; mooring fees; vessel registration fees; storage fees; insurance; and maintenance of truck and vessel trailer.

For those fishing enthusiasts who persist in the activity over time, cost categories and expenses tend to expand. For instance, certain Eureka-based anglers contacted during this study discussed their personal angling histories, which typically began with shore- and pier-based fishing during childhood and progressing through a series of boats as they grew older, including small skiffs used in or just outside of Humboldt Bay, to larger, faster, and more expensive vessels that enabled access to offshore tuna grounds.

Map 4-7

Recreational Fishing Support Sector

This map depicts area businesses of importance to North Coast recreational harvesters as indicated by key informants through ethnographic interviews. The category of accommodations includes: hotels, motels, bed and breakfasts, and vacation rentals.



Charter



Marina/Pier/Boat Launch Facility



Fuel Dock



Boat Sales



Vessel Maintenance & Repair



Accomodations



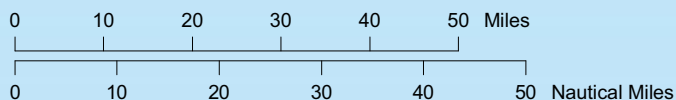
Campground/RV Park



Non-specialized Tackle Store



Gear, Bait & Dive Supplier



Crescent City

101

Del Norte
County

Siskiyou
County

Trinidad

McKinleyville

Arcata

Eureka

Rio Dell

Humboldt
County

Trinity
County

Shasta
County

Garberville

Shelter Cove

Mendocino
County

Tehama
County

Westport

Fort Bragg

Caspar

Mendocino

Little River

Albion

Manchester

Glenn
County

Lake
County

Sonoma
County

Yolo
County

(numerous)
(numerous)

(numerous)
(numerous)

(several)

(several)
(numerous)

(numerous)

(several)

(several)
(several)

(numerous)

Key persons knowledgeable of recreational fisheries describe twelve important fishing equipment providers in Humboldt County. These businesses provide a wide range of products for fishermen, divers, and boaters. Informants also noted that many residents and visitors buy fishing supplies through non-specialty retail stores, such as hardware or sporting goods stores.

Recreational fishing businesses vary in terms of specialization and diversification of products, services, and locations. Two firms in the region are highly diversified in terms of products and services offered, and both operate stores in more than one North Coast community. At other end of the continuum are numerous locally owned businesses that specialize in relatively few products and only in one location. There is a high degree of duplication of some products across all goods providers – for example, all twelve businesses sell fishing tackle.

Key informants in the recreational fishing sector discussed a variety of contemporary challenges currently confronting the industry. These include: the deleterious economic effects of the closed and shortened salmon seasons between 2007 and 2009; rockfish seasons that have been abbreviated by new regulations; competition from online and chain store businesses; increased shipping costs; and a general lack of demand and inability to move inventory due largely to the current economic climate. Storeowners contacted during the study estimate that business losses due to the salmon closures were between 20 and 50 percent. Of note, not all business owners received salmon disaster relief funds.

Some recreation-oriented business owners say they have found new opportunities due to the popularization of kayak fishing. A new halibut fishing trend among recreational anglers has also increased sales of certain gear.

The 2009 salmon season, which limited fishing to the KMZ, was reportedly beneficial to numerous recreational fishing businesses in Eureka and Crescent City. Some regulations obviously constrain recreational activity, however. Key recreational regulations are summarized in Table 4-21 below.

Table 4-21 Key Regulations Affecting Recreational Fishing along the North Coast

Species/Gear or Mode	(Open) Season	(Closed) Areas
Abalone	Open April through November, with the exception of July.	MacKerricher State Marine Conservation Area and Point Cabrillo State Marine Conservation Area
California Halibut	Open year round	NA
Dungeness Crab	Open first Saturday of November through July.	NA
Pacific Halibut	Open May 1 through October 31	Punta Gorda State Marine Reserve
Rockfish complex and Lingcod	Currently open May 15 through August 15 (south of 40°10')/September 15 (north of 40°10') for boat anglers. Open year-round for shore-based anglers and divers targeting rockfish and open April 1 through November 30 for divers and shore-based anglers targeting lingcod.	Closed from 20 fathoms for boat anglers
Salmon	Regulations regarding seasons dependent upon the status of the resources and vary by area with KMZ generally being more restricted. The recreational season for the whole coast was closed in 2008 and severely restricted in 2009.	

Finally, it is of obvious importance that adequate marine infrastructure is critical to all North Coast fleets. Notably, public funds have recently been allocated to develop and maintain such infrastructure. For example, the City of Eureka and the Humboldt Bay Harbor, Recreation, and Conservation District have recently funded a new ice plant, a boat yard, and various launch ramps. Public funds are also supporting maintenance of fishing-related infrastructure in Trinidad and Crescent City. Public and private sector funding for the development and maintenance of marine infrastructure is particularly relevant to this study in that new regulatory challenges could tend to constrain such investment, thereby leading to cascading economic and social effects in small coastal communities that are, to greater and lesser extents, dependent on commercial and recreational fishing and associated industry.

4.4 Preparing for Valid Assessment of Vulnerability and Risk

As has been made clear throughout this report, each of the North Coast study communities is in some manner and to some extent vulnerable to changes in the region's commercial and recreational fisheries. This is a function of the extent to which residents in each coastal town and city are dependent on business and industry associated with those fisheries, and the fact that there are few viable economic alternatives in the region. The situation is compounded by the current national and regional economic recession.

This final section of the report initiates discussion regarding determination of potential vulnerabilities and risks to the various individuals, fleets, support sectors, ports, and communities that are subject to changes associated with the establishment of MPA arrays in the study region. As can be noted in Maps 4-8 and 4-9 below, the field of potentially affected persons and businesses is quite extensive. In fact, the potentially affected universe is significantly larger than is depicted here, since most fishing operations involve not only captains, but also crew members, friends, family members, and other persons who provide some form of direct or indirect support. Similarly, each business in the commercial and recreational fishery service and support sectors tends to involve a number of workers, in some cases many scores of employees.

Implementation of the MLPA has the potential to yield significant implications for individuals and communities involved in marine fisheries across the North Coast. This report sets the stage for systematic analysis of the potential socioeconomic risks and benefits of the process. Once the prospective MPA arrays are sufficiently advanced in the planning process, our intent is to conduct a comparative analysis of which individuals, fleets, support sector businesses, and communities will be subject to the effects of the closures or other spatial restrictions, and how, why, and to what relative extent this is likely to occur. This will be accomplished through analysis of various baseline data and consultation with our extensive network of trusted research participants.

The analysis will focus especially on the effects of the new MPAs on individuals and user groups known to use the potentially affected ocean areas for purposes of commerce and/or recreation, (b) the linkages and vectors between such groups and persons with and to the seafood

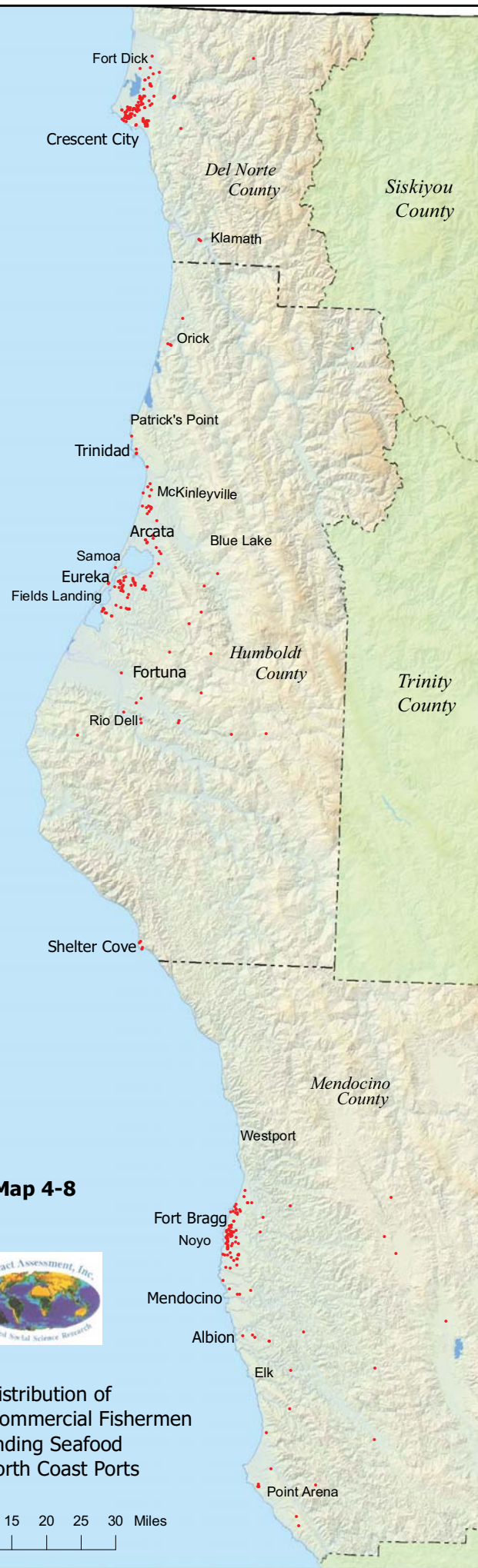
distribution and commercial and recreational fishery support sectors, and (c) the potentially affected seafood distribution and commercial and recreational support sector businesses.

The basic approach is characterized in Map 4-9 below. The map depicts a randomly selected portion of the Eureka and Trinidad area nearshore crab grounds (between 40°57' North and 41°05'45" North), intended to simulate an area closed to fishing due to marine reserve status. The map also depicts persons recently harvesting crab in that area, and the various support sector businesses known to be patronized by the affected harvest sector.

In short, our database is of sufficient depth and specificity to enable empirical determination of the persons and businesses potentially affected by a given MPA or arrays of MPAs, and the nature and extent of involvement with and perceived importance of the potentially regulated nearshore grounds. Thus, once the affected human environment is identified and analytically bounded, we will use existing and newly-gathered information to characterize the likely socioeconomic effects of the new spatial regulation in question. By repeating this process across a number of prospective MPAs and MPA arrays, it will be possible to generate a comparative assessment of the potential risk of each scenario to the harvest and support sectors currently involved in the affected fishery or fisheries.

Comparative analysis of risk will require identification and use of vulnerability indicators for each potentially affected fleet and shoreside support sector, and assignment of a measure of relative vulnerability under each MPA array scenario. Such indicators will include, but not be limited to: degree of specialization and/or diversity of operations; presence or lack of alternative grounds; likelihood of displacement to unused or presently used alternative grounds; distance and related cost or safety challenges associated with displacement to alternative grounds; number of persons and/or businesses on the threshold of leaving the commercial or recreational fishing industries; presence or absence of alternative marketing vectors and opportunities; presence or absence of alternative business in the support sector; and so forth.

The forthcoming analysis will also examine linkages between the fleets, support sector, and harbors to the community in question, and assessment of the relative risk of each array scenario given select indicators of community-level socioeconomic status and resilience. The entire analysis will be framed in terms of: the relationship between human and physical environmental components of the region's nearshore ecosystems; the nature and extent of interrelationships between fisheries sectors and communities across the region; the nature and extent to which the North Coast may be envisioned as an integral dimension of the Northern California nearshore marine ecosystem; and the potential of the new network of MPAs to affect humans dimension of that ecosystem over the course of time.



Map 4-8

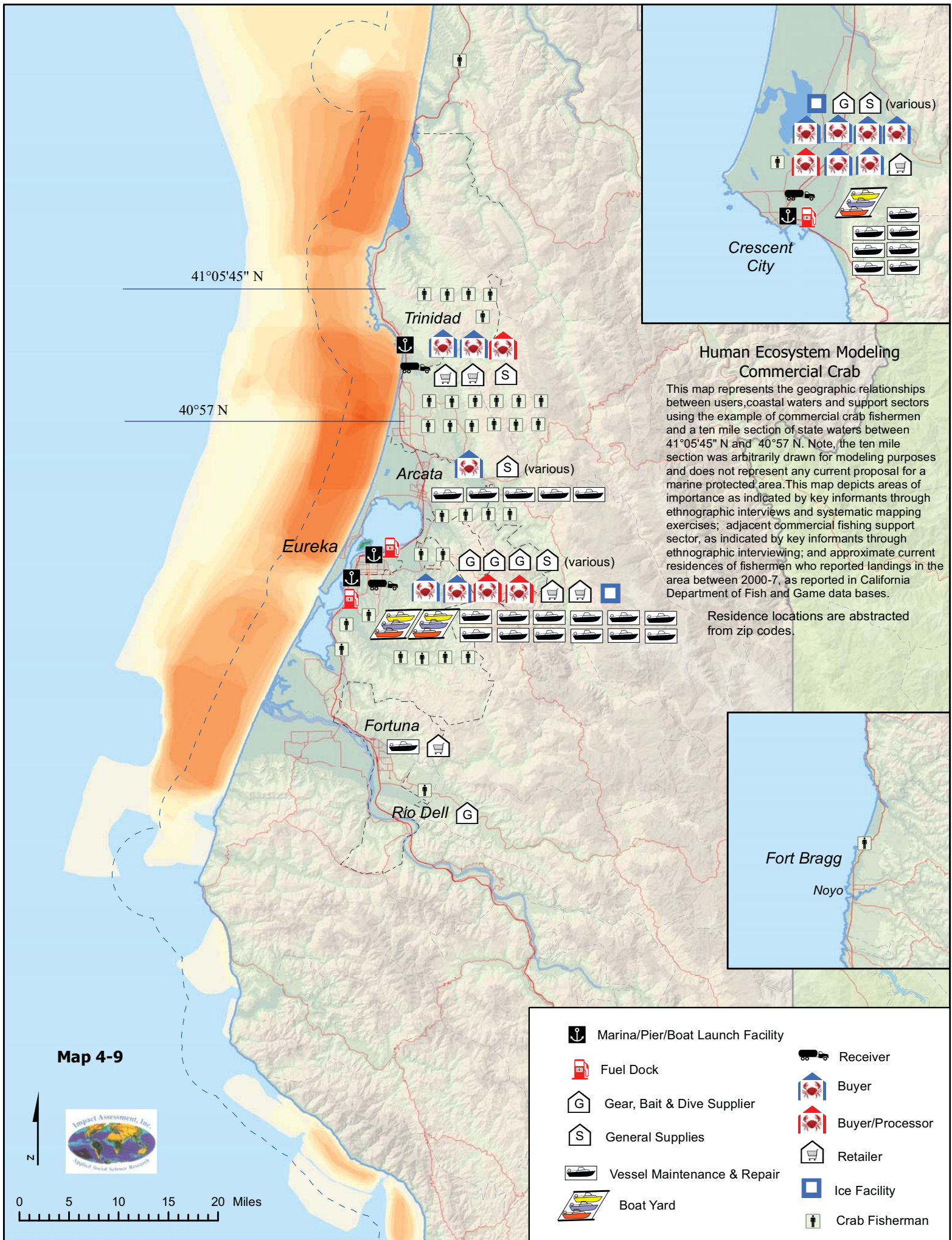
Distribution of
Resident Commercial Fishermen
Landing Seafood
at North Coast Ports

0 5 10 15 20 25 30 Miles



Distribution of
All West-Coast Based
Commercial Fishermen
Landing Seafood
at North Coast Ports

0 50 100 150 200 Miles



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Summary of Key Considerations for Conducting the North Coast Pre-Marine Life Protection Act Community-Based Risk Assessment

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Introduction. Following is a summary of key considerations described in the second interim report for the project titled *North Coast Pre-MLPA Community-Based Socioeconomic Characterization and Risk Assessment* (IAI 2010a). These considerations will be central to the upcoming assessment of how various Marine Protected Area (MPA) array proposals would affect coastal communities, including recreational and commercial fishermen and the businesses that support North Coast fisheries. Persons involved in the Marine Life Protection Act (MLPA) Initiative are encouraged to review the full project report titled “Characterization of the MPA-Affected North Coast Human Environment” which provides detailed information regarding socioeconomic and demographic aspects of the North Coast; commercial and recreational fisheries; and human components of North Coast marine ecosystems that may be affected by the new network of MPAs.

Background. As required by the MLPA, a new network of MPAs is currently being designed and will soon be implemented along the coastline of Humboldt, Del Norte and Mendocino Counties. Because the North Coast fishing industry is already constrained by an assortment of economic, regulatory, and environmental challenges, and because some operators and business owners in the fisheries and distribution support sectors are struggling to remain in the industry, closure of certain fishing grounds has the potential to reduce involvement in commercial and recreational activities that have been central to the North Coast economy for many decades. Given a lack of viable employment alternatives, it is likely that the new network of MPAs will generate some detrimental social and economic effects to the region’s commercial, charter, and recreational fishing fleets and to the ports, harbors, businesses, and communities that support them.

The situation is complicated by a relative lack of local and regional economic alternatives. The Northern California timber industry has been in decline for decades, the current recession is constraining tourism activity, and the region is not physically

well-connected to significant population centers and the economic opportunities available in such areas. Moreover, while the new MPAs may eventually generate environmental benefits along the North Coast, it is as yet uncertain whether closed fishing grounds will one day be reopened. In any event, living marine resources will not immediately flourish within the MPAs or in areas adjacent to the new reserves.

Thus, any socioeconomic benefits potentially resulting from MPA-induced improvements to the status of the region's fish, crab, and shellfish populations can occur only over the long-term. Given the uncertainty of long-term MPA benefits and the likelihood that area closures will constrain an already challenged fishing industry in the near-term, especially under certain MPA array scenarios, this project is needed to develop a clear understanding of fleets and communities that are particularly vulnerable to MPA-related changes.

NORTH COAST REGIONAL ECONOMIC OVERVIEW

Historically, the North Coast regional economy has been based in natural resource extraction and exploitation. Today, economic and population growth in the North Coast region are challenged by a diminishing resource base, a rugged and geographically isolated landscape, extensive state and national park lands, limited inland truck and rail access, the national recession, and other regionally specific factors. Several select current economic characteristics of the North Coast region are depicted in Table 1.

Table 1. Select Economic Characteristics for the North Coast Region: 2006-2008

County	BA Degree or Higher (%)	Median Household Income (\$)*	Per Capita Income (\$)*	Persons in the Civilian Labor Force (%)	Persons below Poverty Level (%)	Median Home Value (\$)*
Humboldt	26.4	40,515	23,262	60.5	18.4	328,100
Del Norte	14.2	35,861	18,276	47.3	20.3	252,600
Mendocino	23.0	43,307	23,685	60.0	16.8	443,600
North Coast	21.2	39,894	21,741	55.9	18.5	341,433
California	29.4	61,154	43,641	64.8	12.9	510,200
United States	27.4	52,175	40,208	65.2	13.2	192,400

*Income is reported in 2008 inflation-adjusted dollars.

Source: BEA 2009; U.S. Census Bureau, American Community Survey 2009

Unemployment rates are consistently much higher for the counties of Humboldt, Del Norte, and Mendocino than for the State of California as a whole (Figure 1). Analysts project that job opportunities are most likely to increase in the information technology and financial sectors (EDD 2009).

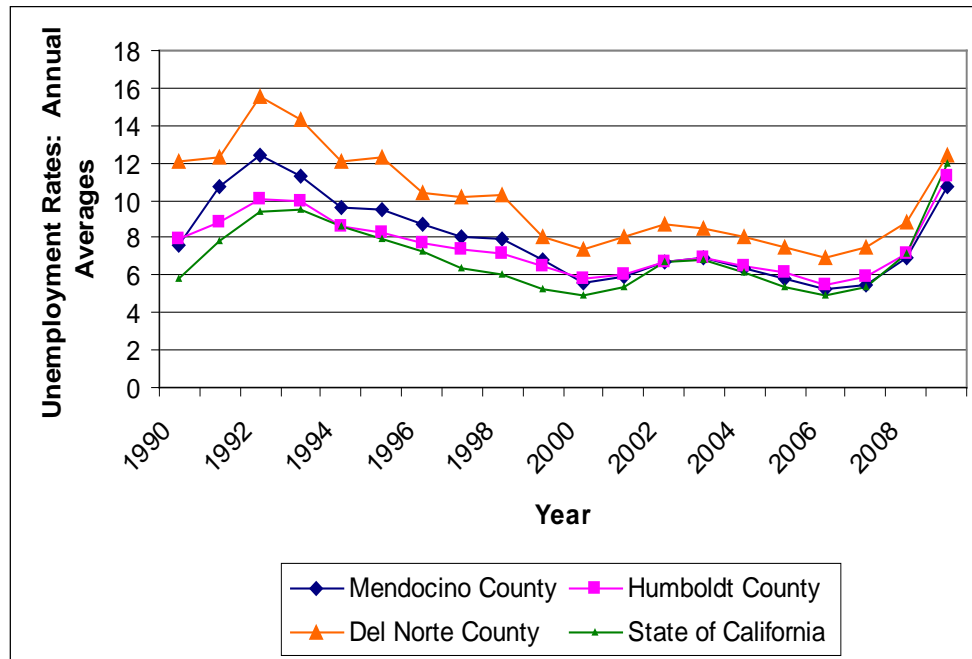


Figure 1. Unemployment Rates for the North Coast Region by County: 1990-2009

Source: <http://www.calmis.ca.gov/file/lfhist/mendohlf.xls>

NORTH COAST COMMERCIAL AND RECREATIONAL FISHERIES

General Overview. The commercial fisheries of the North Coast vary in several respects, including principal species and gear; geographic distribution of effort; amount and value of landings; number of vessels moored in and/or delivering to particular ports; number and types of resident seafood dealers; nature and extent of supporting infrastructure; and so forth. Similarly, the recreational fisheries of the North Coast vary in terms of rates of places and rates of participation; principal species pursued; fishing gear and methods used; relative economic significance, etc. Refer to the full report (IAI 2010a) for specific details regarding North Coast commercial and recreational fisheries.

Recent Challenges to North Coast Commercial Fisheries. Both PacFIN and DMV data reveal a decline in the overall size of the North Coast commercial fishing fleet. Pomeroy and Dalton (2003) assert that the decline between 1981 and 1985 was in part the result of the implementation of a limited entry program for the commercial salmon fishery in 1982, and the effects of the 1982-1983 El Niño event, which affected abundance and also generated weather and seas that limited access to the fishing grounds. Prohibition of commercial salmon trolling in the Klamath Management Zone (KMZ)¹ beginning in 1985 reportedly also contributed to that decline (Pomeroy et al. 2010a). In subsequent years, measures for managing the Chinook salmon population in the KMZ included abbreviated commercial fishing seasons and quotas (Pierce 1998). Participation in the

¹ The KMZ is defined as the area from Humbug Mountain, Oregon, to Horse Mountain, California. Noyo/Fort Bragg is not part of the KMZ.

North Coast commercial salmon fishery was constrained by KMZ closures in 1985, 1992, 1993, 1994, and 1995, and statewide closures in 2008 and 2009.

The introduction of limited entry permit programs for species other than salmon also reduced the number of vessels reporting landings in California and other Pacific Coast states. For instance, the federal groundfish limited entry program has resulted in fewer active commercial operations in California, though profits for captains with permits have reportedly increased (Radtke and Davis 2000). Further, the federal groundfish vessel/permit buyback program reduced the size of the groundfish trawl fleet in all three major harbors in the study region.

Other factors contributing to the overall decline in participation in California and North Coast commercial fisheries include: an increasing number of regulations; periodic scarcity of certain species; increased availability of farmed and imported products (especially salmon) in the marketplace; declining market prices for certain species; and mounting overhead costs, such as fuel, insurance, and Workman's Compensation (Pomeroy and Dalton 2003).

Most recently, the implementation of 29 marine protected areas along the Central Coast of California has affected the nature and extent of participation in that region. In some areas, the MPAs have led to increased travel time and associated increases in fuel expenses and, in some cases, an overall increase in operating costs (Impact Assessment, Inc. 2010).

Based on PacFIN data, the number of processors involved in North Coast fisheries has varied extensively since 1981, ranging from a high of 172 in 1994 to a low of 90 in 1985. Approximately 110 processors purchased or sold seafood in 2009. For this discussion, it is critical to note that direct sales of fish made by individuals/commercial fishermen to seafood restaurants, seafood markets, and other retail establishments account for approximately 75 percent of PacFIN identified processors. As Pomeroy et al. (2010a, 2010b, 2009a, 2009b) report, there were seven active processing and distributing plants/operations and approximately 20 active buyers in the North Coast study region in 2010.

Fishing Communities: Vulnerability, Dependence, and Resilience. Fishing communities are defined in part by the degree to which residents are engaged in or dependent on marine fisheries for economic, social, and cultural purposes. The Pacific Fisheries Management Council (PFMC) defines dependence as the degree to which a community relies on the sustained harvest of a single species or very few species, where the community in question is defined to include fishermen, buyers, processors, various industry support sectors, and the harbors that sustain and are sustained by the commercial and recreational fishing industries (PFMC 2009: 168-169).

A federal socioeconomic study on the rationalization of the Pacific Coast groundfish fishery (PFMC & NMFS 2006)² developed criteria for assessing the degree to which

²Pacific Fishery Management Council (PFMC) and National Marine Fisheries Service (NMFS). 2006. Proposed Acceptable Biological Catch and Optimum Yield Specifications and Management Measures for

West Coast fishing communities were engaged in and/or dependent on commercial fishing activities, and the capacity of those communities to adapt to potentially constraining regulatory changes. Communities deemed highly dependent on commercial fishing but lacking “resilience,” i.e., the social or economic capacity to adapt to change, were classified as “vulnerable” or “highly vulnerable.” Indicators of limited resilience included a high degree of community isolation and rurality, limited industry diversification, and high unemployment and poverty rates. According to the authors, “the purpose of identifying ‘communities of concern’ or ‘areas of vulnerability’ is to alert decision-makers to regions that may require particular focus and/or mitigation efforts” (PFMC & NMFS 2006a and 2006b). It is notable that Del Norte County, and the cities of Crescent City, Fort Bragg, and Eureka were identified as “vulnerable” due to low levels of resilience and high levels of dependence on commercial fishing. The counties of Humboldt and Mendocino were classified as “most vulnerable” (PFMC & NMFS 2006a and 2006b).

As discussed above, residents of the North Coast region have long been dependent on natural resources; that is, timber, fish, and minerals. However, various factors have increasingly challenged the viability of industries involving extraction of those resources, and alternative industries, such as tourism, are limited in part by the geographic isolation of the region. Thus, unemployment rates in Humboldt, Del Norte, and Mendocino counties are chronically high, and significant near-term improvement appears unlikely. While regional planners seek new opportunities and economic development is a priority, many residents remain dependent on some aspect of commercial, recreational, or subsistence fishing activities and are struggling to adapt to changing economic, environmental, and regulatory conditions.

Constraining and Enabling Factors, and Interaction between Commercial Sectors. A variety of factors currently render North Coast seafood processing and distribution firms vulnerable to changes in the harvest sector, and the harvest sector itself is subject to a variety of challenges and forces of change. Again, such factors are important in MLPA assessment and planning processes since the current status of a given fishery is in total always conditioned by historic and contemporary changes in: (a) the marine and regulatory environments; (b) technology associated with navigation, fish-finding, fishing, and seafood processing; (c) the marketplace; (d) the demography of participants in the harvest sector; (e) fixed and trip costs; and (f) processing and transportation costs, among other factors.

Regulatory Factors. Participants in the various sectors of the North Coast commercial fishing industry repeatedly mention that the physical and service infrastructure associated with seafood processing and distribution has been significantly affected by a long series of regulatory changes. Most business owners discuss regulatory changes in the salmon, groundfish, albacore, and shrimp fisheries. In some cases, harvest sector regulations have led to the departure of buying and processing facilities from the region. Concerns have been raised about the future of the region’s fisheries support sectors, largely in

association with the potentially constraining effects of prospective new quotas and by-catch rules associated with an IFQ system for groundfish, and pot limits for the Dungeness fishery.

It should be noted that a large percentage of North Coast fishing grounds are, at some point during the year, closed to pursuit of certain species or to use of certain types of gear. Particularly important regulations affecting North Coast fleets and support sector businesses are depicted in Table 2 below. Because most closures involve a temporal aspect, both season and affected area are provided in the table.

Table 2. Key Regulations Affecting Commercial Fishing Operations along the North Coast

Species/Gear Type	(Open) Season	Closed Areas
Coonstripe Shrimp	Open May 1st to October 31 st	--
Dungeness Crab	Open December 1st to July 15th	Crabs harvested from one mile radius of Eel River, Humboldt Bay, and Trinidad Bay may not be sold
Nearshore Rockfish Complex (hook-and-line) and Lingcod (limited entry and open access)	(Rockfish) Open May through February south of 40°10' ; open all year round north of 40°10' (Lingcod) Open May through November	Closed 30-150 fathoms south of 40°10' and 20-100 fathoms north of 40°10'
Salmon	Regulations regarding seasons depend upon the status of the resources and vary by area with KMZ generally being more restricted. The commercial season for the whole coast was closed in 2008 and 2009.	
Sea Urchin	Open seven days per week from November through May, and Monday through Thursday from June through October.	Point Cabrillo State Marine Conservation Area

Regulations can tend to redistribute fishing effort and lead to a reordering of existing systems of fisheries-related social and economic interaction. For instance, key persons in the harvest sector report that spatially designated rockfish quotas have forced some fishermen to change harbors, and that salmon, nearshore rockfish, and trawling regulations have displaced fishing effort into various crab grounds, leading to interaction between fleets that were formerly not as likely to interact on the ocean. Notably, KMZ-specific salmon bag limits now encourage fishermen to offload on a daily basis, thereby restricting their range to within a day's voyage from port. Destination and range have also been affected by regulations that preclude delivery to a specific port if that port is located in a closed area. Further, because participation in the federal waters groundfish fisheries requires use of observers and/or vessel monitoring systems (VMS), some fishermen are opting for participation in various nearshore fisheries.

For fishermen who participate in both crab and the groundfish trawl fishery, decisions regarding where to fish are based largely on allowable/available quota and price per pound. Quota availability and prices permitting, the trawl fishery is often said to be relatively more stable and dependable than the crab fishery. This perspective is captured in the comment of a key fisherman in Eureka who said that when the [petrale sole] quota is good, it is like a "bird in the hand," whereas finding crab can be a "guessing game." However, the fisherman added that the future may hold challenges, believing that

pending establishment of an Individual Fishing Quota (IFQ) system will make the crab fishery more competitive.

Commercial urchin divers and kelp harvesters in northern Mendocino County assert that there has been some displacement of effort arising from establishment of MPAs in southern portions of the county and in Sonoma and Marin Counties. Displacement of effort is also said to be occurring amongst recreational abalone divers. The situation has given rise to concerns about possible overharvesting and may be instructive of the potential future ecosystem effects of MPAs along the North Coast and elsewhere in the larger region.

The sum effect of historic changes, especially regulatory changes, has been a significant level of attrition of commercial fishing fleets across the North Coast. Commercial fishermen frequently note that diminishing fleet size and hence diminishing levels of catch and effort have resulted in fewer buyers and processors in the region, and consolidation of many remaining businesses. Consolidation also occurs in part from pressures and challenges within the support sector itself. For instance, market challenges associated with an influx of seafood harvested outside the U.S., and increasing processor licensing fees, waterfront leasing costs, and shipping fees are but a few of the economic challenges confronting the processing and distribution sector. Some informants asserted that, as is the case in the harvest sector, numerous business owners and operators in the processing and distribution sectors were also aging out of the industry without replacement, thereby furthering loss of small seafood businesses in the region.

Consolidation tends to reduce the number of distribution vectors and options for participants in the harvest sector, thereby creating critical nodal relationships that are not always optimal for fishermen and that in some cases may render a given fishery vulnerable to further challenges. The prospective effects of MPA-related closures will need to be addressed with due consideration of this historic and contemporary context – especially since such effects may involve further constraints on the spatial distribution of effort and level of production in the harvest sector, and hence the viability of support sector businesses across the region.

Numerous Social and Economic Linkages. Part of the MPA assessment context is the backward and forward nature of linkages between the harvest, processing/distribution, and support sectors. That is, each sector is mutually dependent on the viability of the other, and by extension the status of the entire system can affect social and economic aspects of life in the host communities and region as a whole.

Commercial and recreational fishermen require many products and services. These vary depending on target species, gear and vessel requirements, and other factors. Because seafood is highly valued, fishermen also *provide* an important service. Socioeconomic relationships involving fisheries goods and services can be extensive and complex, even for a single fisherman in a small community.

The following illustration (Figure 2) is intended to represent the basic extent of documented linkages between an Albion-based commercial fisherman and various support sector goods and service providers with whom he interacts in Albion and elsewhere along the North Coast. By multiplying linkages identified in this and more complex schematics across the Albion fleet it would be possible to begin to approximate the actual complexity and extent of fishery-specific linkages in this rural area. Identifying the key components, vectors, linkages, and relationships involved in nearshore North Coast fisheries is a central objective of this project, and a requisite for effective assessment of the range of effects of the MLPA process along the North Coast.

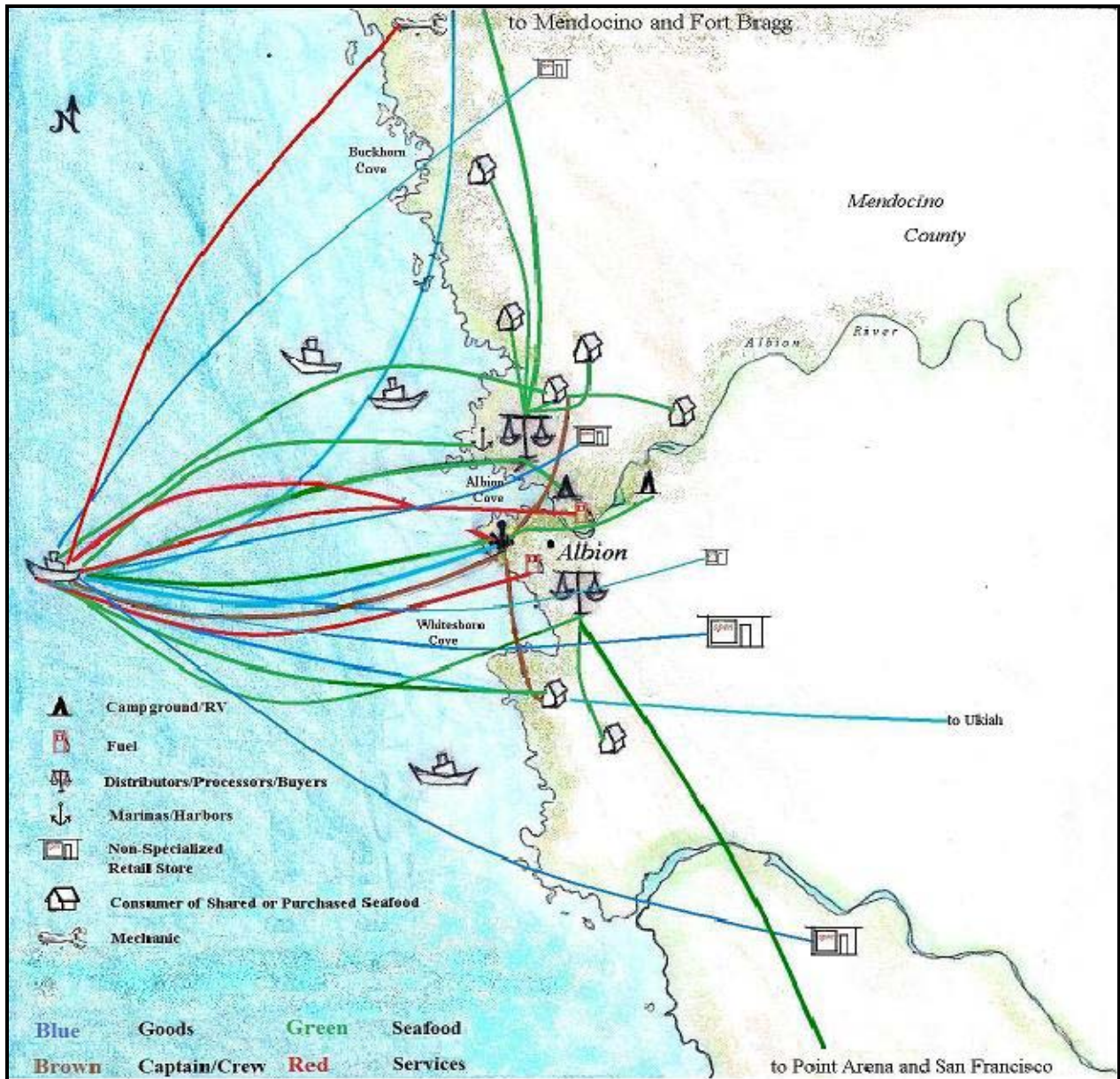


Figure 2. Known Social and Economic Linkages between an Albion-based Commercial Fisherman and the Shoreside Seafood Processing, Distribution, and Support Sectors

Important Cost Categories and Economic Considerations. This study and similar work conducted by IAI along the Central Coast (IAI 2010b) makes clear that active commercial fishermen tend to prioritize certain economic factors and issues when discussing their fishing operations. An emphasis is often placed on the following: (a) fuel costs, (b) vessel and engine purchase and maintenance costs; (c) crew costs; (d) the availability and/or abundance of various marine resources and current pricing factors; (e) optional fishing strategies and fisheries; and (f) side jobs and alternative forms of employment.

With regard to cost factors, California gas and diesel prices have been particularly challenging in recent years, and very typically a principal consideration in one's fishing strategy. For instance, participants in the North Coast nearshore rockfish fisheries unavoidably operate on tight budgets.

Thus, as long as fish are present, most captains will operate as close to port as possible. Indeed, if resources are abundant near port, small vessels can be advantageous in that they are relatively cheap to purchase, operate, and maintain. Certain North Coast small boat fisheries have developed in keeping with this principle. This too is a significant MLPA planning consideration since certain nearshore areas amenable to small boat fishing may ultimately become off-limits.

There are other ways to save money. For instance, certain operators of large crab vessels typically crab only during the first four to eight weeks of the season and engage in lucrative federal water fishery options later in the year. For crabbers who do participate in the late season inshore Dungeness fishery, decisions to do so are typically based on calculations regarding: probable rate of pot loss; intra- and inter-fleet reports about the abundance of crab; crew costs; fuel costs; and current prices being paid for crab. One seasoned crabber summarized the basic economic principal of work in the harvest sector, stating that "every crabber has to calculate his own breaking point as to when it no longer pays to be out crabbing."

It is an important if unfortunate fact that the marine environment is highly corrosive. Thus, fishing and crabbing are particularly hard on gear, and plying the ocean is particularly hard on vessels and engines. As such, fishermen must continually maintain their equipment, and purchases of new fishing gear and vessel components are ongoing. Minimum support sector requirements are said to include: a marine supply store, a fabricator, a welder, a mechanic, an electrician, a refrigeration specialist, a woodworker, a fiberglass worker, and haul-out facilities.

As depicted in Table 3 below, recent survey-based economic research conducted by Hackett et al. (2009) estimates fixed and variable costs for commercial fisheries conducted from ports in Del Norte, Humboldt, and Mendocino Counties. The results are useful in that they rank costs by fishery, and provide an inventory of typical variable and fixed costs by fishery.

Table 3. Total Annual Costs for Commercial Fleets Operating in the North Coast Region

Occupational Configuration	Fixed Costs	Variable Costs	Total Cost
Dungeness Crab– Medium & Large Vessels	5,798,289	5,590,307	11,388,596
Trawl	701,997	2,087,711	2,789,708
Salmon & Dungeness Crab – Medium & Large Vessels	1,236,866	855,733	2,092,599
Salmon	648,720	356,049	1,004,770
Nearshore and Groundfish Trap	466,918	371,906	838,824
Dungeness Crab – Small Vessels	164,043	512,210	676,253
Longline	354,868	181,424	527,293
Sea Urchin	300,923	202,887	503,811
Hook-and-Line (live)	295,453	198,612	494,064
Hook-and-Line	208,089	169,596	377,685
Salmon and Albacore	145,021	94,886	239,907
Prawn Trap	79,819	36,372	116,191
All Other	47,938	67,028	114,966
Total	10,439,945	10,724,723	21,164,668

Common fixed cost categories include: engine purchase and repair; electrical gear purchase and repair; hull purchase and repair; fishing gear purchase and repair; vessel insurance; storage; interest on payments; federal and state taxes; boat registration, permit, and commercial license fees; and home and transient slip fees. Variable or trip cost categories include: bait, crew wages, food, fuel, harbor, ice, transportation, association membership fees, and landing taxes. Each of the cost categories may potentially be subject to increases or decreases as a result of any new fishing regulations in the study area, including area-specific regulations associated with new marine reserves.

Finding and keeping crew is a common topic of discussion among participants in the North Coast crab fishery. Other nearshore fisheries also require the ongoing assistance of crew, but to a lesser extent. Youthful crew members are reportedly hard to keep employed due to the seasonality of many fisheries and the availability of state unemployment benefits which for some can offset the need to work on a consistent basis.

Fishing and the Challenges of Weather, Sea, and Oceanographic Conditions. Weather, sea, and oceanographic factors and conditions are particularly important aspects of fishing across the world's oceans. Environmental conditions can significantly affect patterns of use of California's nearshore marine ecosystems, and this is certainly the case along the North Coast, which is exposed to some of the most powerful storms and swells on the planet. The description is intended to further understanding of the complex nature of the region's marine fisheries and the factors which influence captains' decisions to use or avoid certain ocean areas during certain periods of times when conditions are not optimal.

Weather and sea conditions are an immediate and profound planning consideration for any fishing trip. Seasoned captains with sturdy commercial vessels and reliable engines are more likely to engage and persist in challenging conditions than the average recreational captain. But for many days of the year along the rugged North Coast, even the most experienced and well-equipped captains will stay at port. This constraint can

have a profound effect on production, especially since the allowable number of fishing days is often limited to a certain number of days per season or by available quota. Thus, weather and sea conditions can effectively shorten a regulatory season, as is the case, for example, in the commercial hook-and-line rockfish fishery. Avid participants in this fishery and in the nearshore charter fishery estimate that some 25 to 30 percent of allowable fishing days are lost to poor weather and sea conditions. Persons knowledgeable of the area's recreational fisheries, estimate that as many as 40 to 50 percent of the open seasons are lost to poor conditions. Divers and kayak fishermen are often limited by weather and sea states.

The interaction between wind and wind-influenced sea surface conditions, swell conditions, tide, fog, and orthographic and bathymetric features significantly influence the decision-making processes of North Coast fishermen. Large swells and certain tidal stages can make launching or exiting and entrancing harbors especially difficult, particularly in areas of maximum exposure to the west and northwest (and southwest during southwest swell events). For instance, tidal conditions interacting with swells and winds can make launching at Shelter Cove and exiting and entering Albion Harbor and Humboldt Bay quite difficult, often resulting in cancelled or shortened fishing trips.

Such factors can also lead fishermen to find sheltered areas in which to access the ocean and fish during challenging sea and weather conditions. For example, key informants report that recreational fishermen will often travel from Brookings, Oregon to fish from Crescent City during the winter months, since Crescent City Harbor is relatively well-protected from the west. Similarly, some large commercial crab vessel captains avoid the seasonal travails of entering and exiting Noyo Harbor by mooring in Eureka, and captains of small sea urchin vessels working from Albion typically plan their activities around the challenges of re-entering the harbor.

Small-vessel captains often discuss strategies for adapting to seasonal changes in weather and sea states. In the Crescent City area, many small-boat captains prefer fishing in the lee of Point St. George during certain times of the year. In the Fort Bragg area, sea urchin divers, who typically dive close to shore, seek areas protected from winter southerlies and spring northwesterlies. Eureka-area fishermen note that by the afternoon hours, wind and chop are commonly at their worst between Eel River and Steamboat Rock, or about 10 to 25 nautical miles south of the entrance to Humboldt Bay. This area is often best avoided by small vessels. In the Fort Bragg area, salmon trollers note the relief from confused seas that is often found at Usal Bight.

Such considerations are critically important in the MLPA planning process. Placement of MPAs has the potential to redirect typical patterns of use, including use of coastal features for purposes of protection from dangerous sea and weather conditions.

The act of fishing and setting pots should also be considered in terms of the effects of weather and sea conditions. For instance, big storms can further the tendency of crab pots and lines to entangle. Pots can also drift into and mire in muddy areas and kelp beds. These situations often require time-consuming and dangerous effort to rectify. For

recreational and commercial divers, winter swells often necessitate moving away from the shoreline to avoid surge and swells. Visibility can also be limited during storm and swell events.

Clearly, changing oceanographic conditions also affect fishing and crabbing and the strategies and decisions of participants in the various fleets. Species abundance and the distribution of availability and abundance fluctuate in ways that are not readily predictable. For example, crabbers often assert that crab hot spots shift from year to year and even within a given season. Likewise, the location of salmon tends to vary during and between seasons. Location of quality sea urchins also tends to vary, depending in part on the variable quality of kelp.

Important Dimensions of the Recreational Sector. Extensive revenue is generated by non-resident recreational fishermen who travel to and stay in North Coast communities to engage in often costly fishing, crabbing, and diving activities. Indeed, from an economic perspective, just as revenue flows through a system of harvesters, buyers, processors, distributors, and commercial fishing support sector businesses, so it also flows through a system of anglers and recreational fishing support sector businesses. Basic components of the North Coast recreational fisheries support sector are depicted in Figure 3 below. Recreational fishing trips on the North Coast are far fewer than those in central and southern California (Table 4).

Much recreational fishing activity is seasonal in nature, and in the warmer, calmer months, North Coast campgrounds, RV parks, and local hotels are often booked to capacity, with many anglers and their families also patronizing local restaurants, stores, gas stations, and laundry services. Charter fishing operations are also widely patronized during good weather months.

Owners of charter operations must address the full range of fixed and trip costs, with many expenditures relating to maintenance of vessels, gear, and crew, and to the safety and enjoyment of the patrons. Charter fishing straddles the commercial and recreational fishing industries and in many ways constitutes its own form of industry.

Pendelton and Rooke (2006) compare recreational fishing expenditures for charter patrons and private boat anglers in California. Average daily expenditures for charter patrons in Northern California were \$128 for residents and \$374 for non-residents. Average daily expenditures for resident and non-resident anglers using their own vessels were \$50 and \$198, respectively (Pendelton and Rooke 2006:12).³

³ Readers are also referred to Steinback et al. (2004) for discussion of expenses associated with charter fishing elsewhere in the U.S.

A variety of trip-related expenses are incurred when fishing from privately owned recreational vessels. These include:

- (a) travel to the harbor;
- (b) food;
- (c) fuel for the vessel;
- (d) launching fees where applicable;
- (e) various fishing gear;
- (f) bait; and
- (g) ice.

There are also numerous durable goods costs, such as:

- (a) the fishing vessel;
- (b) one or more engines;
- (c) vessel necessities such as anchor, mooring lines, running lights, safety equipment;
- (d) marine electronics;
- (e) mooring fees;
- (f) vessel registration fees;
- (g) storage fees;
- (h) insurance; and
- (i) maintenance of truck and vessel trailer (for those who trailer their vessels).

For those fishing enthusiasts who persist in the activity over time, cost categories and expenses tend to expand. For instance, certain Eureka-based anglers contacted during this study discussed their personal angling histories, which typically began with shore- and pier-based fishing during childhood and progressing through a series of boats as they grew older, including small skiffs used in or just outside of Humboldt Bay, to larger, faster, and more expensive vessels that enabled access to offshore tuna grounds.

Table 4. Estimated Number of Angler Trips by District and Mode: 2007

District	Fishing Mode				Total
	Man-made Structures	Beach and Bank	CPFV	Private and Rental Boats	
South	1,144,114	611,388	201,947	215,826	2,173,275
Channel	197,230	155,321	34,817	24,643	412,011
Central	157,502	137,256	43,166	25,245	363,169
San Francisco	274,891	294,194	39,238	38,457	646,780
Wine	13,481	23,271	5,523	7,094	49,369
Redwood	43,393	36,522	4,626	6,889	91,430
Statewide	1,830,611	1,257,952	1,257,952	318,154	3,736,034

Source: CDFG 2008

* CDFG has designated Mendocino County and the Shelter Cove section of Humboldt County as the “Wine District,” and Del Norte County and the northern part of Humboldt County as the “the Redwood District.”



Figure 3. Basic Components of the North Coast Recreational Fisheries Support Sector

Key persons knowledgeable of recreational fisheries in the Eureka area listed twelve particularly important recreational fishery support businesses in the community. Informants also noted that many residents and visitors buy fishing supplies through non-specialty retail establishments, such as hardware and sporting goods stores.

Recreational fishing businesses vary in terms of specialization and diversification of products, services, and locations. Two firms in the region are highly diversified in terms of products and services offered, and both operate stores in more than one North Coast community. At other end of the continuum are numerous locally owned businesses that specialize in relatively few products and only in one location. There is a high degree of duplication of some products across all goods providers – for example, all twelve businesses sell fishing tackle.

Key informants in the recreational fishing sector discussed a variety of contemporary challenges currently confronting the industry. These include: the deleterious economic effects of the closed and shortened salmon seasons between 2007 and 2009; rockfish seasons that have been abbreviated by new regulations; competition from online and chain store businesses; increased shipping costs; and a general lack of demand and inability to move inventory due largely to the current economic climate. Storeowners contacted during the study estimate that business losses due to the salmon closures were between 20 and 50 percent. Of note, not all business owners received salmon disaster relief funds.

Some recreation-oriented business owners say they have found new opportunities due to the popularization of kayak fishing. A new halibut fishing trend among recreational anglers has also increased sales of certain gear.

The 2009 salmon season, which limited fishing to the KMZ, was reportedly beneficial to numerous recreational fishing businesses in Eureka and Crescent City. Some regulations obviously constrain recreational activity, however. Key recreational regulations are summarized in Table 5 below.

Table 5. Key Regulations Affecting Recreational Fishing along the North Coast

Species/Gear or Mode	(Open) Season	(Closed) Areas
Abalone	Open April through November with the exception of July.	MacKerricher State Marine Conservation Area and Point Cabrillo State Marine Conservation Area
California Halibut	Open year round	NA
Dungeness Crab	Open first Saturday of November through July.	NA
Pacific Halibut	Open May 1 through October 31	Punta Gorda State Marine Reserve
Rockfish complex and Lingcod	Currently open May 15 through August 15 (south of 40°10'); September 15 (north of 40°10') for boat anglers. Open year-round for shore-based anglers and divers.	Closed from 20 fathoms for boat anglers
Salmon	Regulations regarding seasons dependent upon the status of the resources and vary by area with KMZ generally being more restricted. The recreational season for the whole coast was closed in 2008 and severely restricted in 2009	

Finally, it is of obvious importance that adequate marine infrastructure is critical to all North Coast fleets. Notably, public funds have recently been allocated to develop and maintain such infrastructure. For example, the City of Eureka and the Humboldt Bay Harbor, Recreation, and Conservation District have recently funded a new ice plant, a boat yard, and various launch ramps. Public funds are also supporting maintenance of fishing-related infrastructure in Trinidad and Crescent City. Public and private sector funding for the development and maintenance of marine infrastructure is particularly relevant to this study in that new regulatory challenges could tend to constrain such investment, thereby leading to cascading economic and social effects in small coastal communities that are, to greater and lesser extents, dependent on commercial and recreational fishing and associated industry.

PREPARING FOR VALID ASSESSMENT OF VULNERABILITY AND RISK

Each of the North Coast study communities is in some manner and to some extent vulnerable to changes in the region's commercial and recreational fisheries. This is a function of the extent to which residents in each coastal town and city are dependent on business and industry associated with those fisheries, and the fact that there are few viable economic alternatives in the region. The situation is compounded by the current national and regional economic recession.

This final section initiates discussion regarding determination of potential vulnerabilities and risks to the various individuals, fleets, support sectors, ports, and communities that are subject to changes associated with the establishment of MPA arrays in the study region. The field of potentially affected persons and businesses is quite extensive. Most fishing operations involve not only captains, but also crew members, friends, family members, and other persons who provide some form of direct or indirect support. Similarly, each business in the commercial and recreational fishery service and support sectors tends to involve a number of workers, in some cases many scores of employees.

Implementation of the MLPA has the potential to yield significant implications for individuals and communities involved in marine fisheries across the North Coast. This report sets the stage for systematic analysis of the potential socioeconomic risks and benefits of the process. Once the prospective MPA arrays are sufficiently advanced in the planning process, our intent is to conduct a comparative analysis of which individuals, fleets, support sector businesses, and communities will be subject the effects of the closures or other spatial restrictions, and how, why, and to what relative extent this is likely to occur. This will be accomplished through analysis of various baseline data and consultation with our extensive network of trusted research participants.

The analysis will focus especially on: (a) the effects of the new MPAs on individuals and user groups known to use the potentially affected ocean areas for purposes of commerce and/or recreation, (b) the linkages and vectors between such groups and persons with and to the seafood distribution and commercial and recreational fishery support sectors, and

(c) the potentially affected seafood distribution and commercial and recreational support sector businesses.

The basic approach is characterized in Figure 4 below. The map depicts a randomly selected portion of the Eureka and Trinidad area nearshore crab grounds (between 40°57' North and 41°05'45" North), intended to simulate an area closed to fishing due to marine reserve status. The map also depicts persons recently harvesting crab in that area, and the various support sector businesses known to be patronized by the affected harvest sector.

In short, our database is of sufficient depth and specificity to enable empirical determination of the persons and businesses potentially affected by a given MPA or arrays of MPAs, and the nature and extent of involvement with and perceived importance of the potentially regulated nearshore grounds. Thus, once the affected human environment is identified and analytically bounded, we will use existing and newly-gathered information to characterize the likely socioeconomic effects of the new spatial regulation in question. By repeating this process across a number of prospective MPAs and MPA arrays, it will be possible to generate a comparative assessment of the potential risk of each scenario to the harvest and support sectors currently involved in the affected fishery or fisheries.

Comparative analysis of risk will require identification and use of vulnerability indicators for each potentially affected fleet and shoreside support sector, and assignment of a measure of relative vulnerability under each MPA array scenario. Such indicators will include, but not be limited to: degree of specialization and/or diversity of operations; presence or lack of alternative grounds; likelihood of displacement to unused or presently used alternative grounds; distance and related cost or safety challenges associated with displacement to alternative grounds; number of persons and/or businesses on the threshold of leaving the commercial or recreational fishing industries; presence or absence of alternative marketing vectors and opportunities; presence or absence of alternative business in the support sector; and so forth.

The forthcoming analysis will also examine linkages between the fleets, support sector, and harbors to the community in question, and assessment of the relative risk of each array scenario given select indicators of community-level socioeconomic status and resilience. The entire analysis will be framed in terms of: the relationship between human and physical environmental components of the region's nearshore ecosystems; the nature and extent of interrelationships between fisheries sectors and communities across the region; the nature and extent to which the North Coast may be envisioned as an integral dimension of the Northern California nearshore marine ecosystem; and the potential of the new network of MPAs to affect humans dimension of that ecosystem over the course of time.

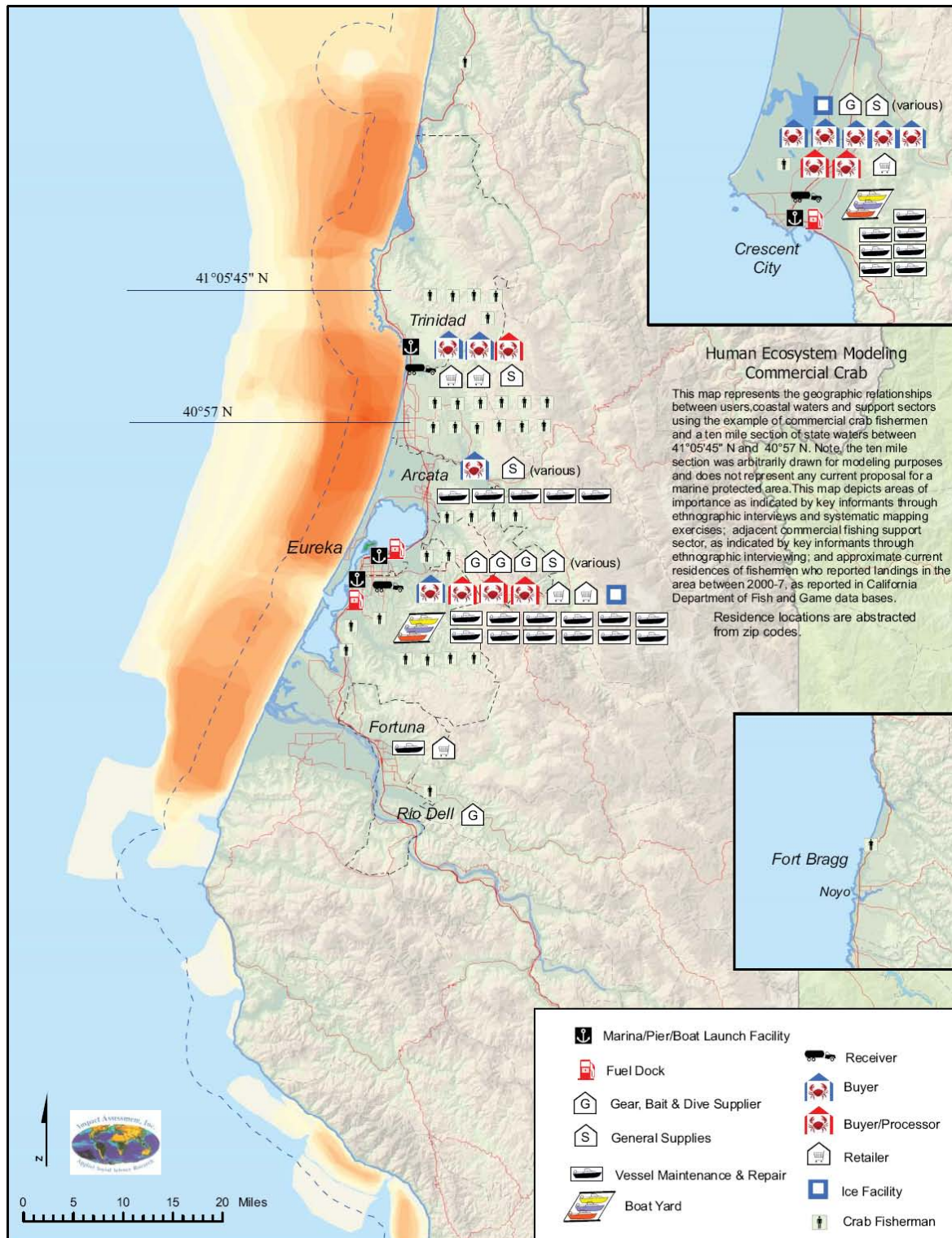


Figure 4. A randomly selected portion of the Eureka and Trinidad area nearshore crab grounds (between 40°57' North and 41°05'45" North), intended to simulate an area closed to fishing due to marine reserve status. The map depicts persons recently harvesting crab in that area, and the various support sector businesses known to be patronized by the affected harvest sector.

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From: mike carpenter

Sent: Tuesday, August 24, 2010 6:24 PM

To: MLPAComments

Subject: Att. SAT, BRTF, NCRSG and the california legasators resposibable for this.

I write this from someone who has been involved heavy for over a year.

I feel that this was not an open process just because everything just seemed to be already fixed on the out come.

i know you say that is not science and it is not just like most the decisions made about important LOPs of sea urchins, kelp sea weed and abalone.

the answers we received were expected and denied against us with good reasons(not) case in point sea urchin will be controlled by wolf eels and sun stars. i saw no numbers of how many eels and stars there where on the north coast. i know it is not greater than 1987 and yet the number of urchins were out of control at that time.

At this point if you leave an area alone from Sea urchin Harvest you get a barren i know you will not use the science that proves this so it shows how some one has a predetermined out come which i say is no urchin divers and a collapse in abalone fisheries because of effort shift(which is already being talked about in Sonoma and southern Mendocino county) and an effect on the edible seaweed we are not sure of.

We have to live here year round i do not see any study being done with people on life in the ocean in the winter months here correct me if i am wrong. I think the sea urchin and abalone studies are done together due to funding and it is done in July in Van Dam after three month of harvest of abalone in most the shallow water bad science in my view. I dive Van Dam in the winter and there are abalone and i mean a lot and big breeding stock.

my last comment is that it is not about fishing yet everyone from the Beginning has made it about fishing and how much everyone was giving up well, if fisherman are everyone than your right. Thank You and time will show the Truth and it will be your names there, not mine. I use to make my living and got most of all my family's food from the ocean. When they made live fish licences which was a fishery i did not like i did not get my permit so now i can not catch a fish to bring home to eat for my family they took the food right out of my mouth imagine that a commercial fisherman that can not catch a fish to feed his family that is messed up i can not believe any one would not agree with that. I always thought if i had a commercial fishing licence i could catch fish (not) Have a Great Day and Enjoy your Foreign fish.

--

Michael A Carpenter

Albion Harbor Regional Alliance

Albion Ca. 95410